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PROCEEDINGS

OF THE

BATH NATURAL HISTORY

AND

ANTIQUARIAN FIELD CLUB.

VOL. V. ~~No. 4~~

1882 — 1885.

PRICE HALF-A-CROWN.

BATH:
PRINTED (FOR THE CLUB) AT THE HERALD OFFICE, NORTH GATE.
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Dolebury Camp on Mendip. *By the* Rev. Preb. SCARTH, M.A.

(Read December 7th, 1881*).*

Dolebury Camp is situated on the ridge of the Mendip Hills, on the northern slope, about four miles from the town of Axbridge, and commands a pass through the Hills. The Bristol and Bridgwater road now passes near it on the western side of the ravine. This line of road was formed in the early part of the present century; the old coach road, which is still visible, passed over the ridge a little farther west, towards Banwell. Dolebury is about 700 feet above the level of the sea, and is separated from the little village of Rowberrow by a deep ravine. The ground rises from the entrance at the west end 155 feet.

The form of the Camp is an irregular parallelogram, adapted to the summit of the hill. It contains 22¼ acres, and has a rampart of stones throughout, single on the south side, where the ravine is a sufficient protection, but on the north side, where it is more accessible, the stone rampart is doubled, and it is also defended by an outer ditch. On this side the rampart rises to the height of 30 feet, and is particularly well developed at the north-eastern angle, where it is gradually rounded off. Here, where it joins the level surface of the hill, the rampart is much raised and the ditch is widened, and so it continues until it reaches the south declivity, where the ditch ceases. There is an entrance at the eastern end, and a road seems to pass straight through the Camp to the western entrance, which assumes somewhat the form of a wedge, and here is the main entrance from the valley below. A winding road, protected by banks on each side, led up to this entrance.

A very good plan has been made of this Camp by Mr. Dymond, of Weston-super-Mare.

Dolebury is one of the largest and most perfect Camps in Somerset, and every care should be taken to preserve its ramparts and other features entire. At first sight the rampart appears to be formed of loose stones and fragments of limestone

rock, of which the Mendip ridge is here composed ; but upon closer examination, and removing the upper covering, it is seen to have been constructed of dry walling from ten to twelve feet thick. This is very visible on the north side towards the eastern bend, where the second rampart still preserves its original form, and appears as a regularly built unmortared wall. The stones have been dug out of the ditch and also taken from the surface of the Camp, and the construction must have been a work of time and great labour.

On the north-eastern side the surface has been considerably disturbed by former attempts at mining, and a cottage, now in ruins, has been erected, but in other portions remains of ancient occupation are very plain in the long lines of raised earth, which probably mark the site of buildings. There are traces of four ridges not quite equi-distant from each other. At the south-western angle is an earthern enclosure, which, together with the angle of the Camp, here forms a square, and has all the appearance of a fortified post within the area of the Camp ; it is very near the western entrance, and may have formed the lodgings of a guard to protect the gate. A similar small quadrangular enclosure is found in the large Camp on Clifton Down. These smaller Camps within the larger lead to the idea that they may have been occupied in later times and by a smaller force.

On the opposite side of the ravine, towards Banwell, and just above the point where the Bridgwater road is carried along the face of the hill, are the traces of another and smaller Camp, called Dinghurst Camp. This has been almost destroyed by quarrying the stone, but sufficient of the rampart remains to show that it was either another strong position coeval with Dolebury, guarding the pass, or else constructed in after times as an additional security.

Dolebury is in the parish of Churchill, and takes its name from the peculiarity of its position, commanding a well-watered plain. The name is undoubtedly Ancient British or Celtic; it occurs in

Wales, where we have Dolgellau, Dolwyddelan, Dolbadarn, and other like names, and we have also Dol in Brittany, a very ancient town. It is generally believed to signify a level tract of land watered by a river. This agrees with the prospect from Dolebury, a fertile tract between two ranges of hills, through which flows the Yeo, which at times floods the lower lands and gives the appearance of a lake, and this must have been more frequent in ancient times before the embankments were formed which now keep back the rise of the tides in the Severn.

The town of Deal, in Kent, is supposed to owe its name to the same kind of position.

The word "bury" attached to Dol only expresses the fortified point. The name is therefore the Entrenched Spot over the Valley, and certainly a most commanding position it is, and has been so for probably more than 2,000 years!

If its first foundation was British it was occupied in Roman and in Saxon times, as Collinson states that both Roman and Saxon coins have been found within it.* Let us now consider what reason we have for assigning this Camp to the British period.

From the height in which it is placed may be seen the Bay of Weston, crowned by the Worle hill, under which nestles the modern town, gradually encroaching upon the slope of the hill. On this hill is a very ancient and perfect camp,† until within a recent period, when the outer works of the fortress have succumbed to modern improvements. Here walls of a very similar construction to those of Dolebury can be traced, only much larger and stronger, and the eastern portion is cut off from the level of the hill by five or six consecutive ramparts. Within the area, which is divided into two parts, are found numerous

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* See Collinson's History of Somerset, vol. iii., p. 579.

† For an account of the camp over Weston-super-Mare see Journal of Arch. Association and Somerset Arch. and Nat. Hist. Society, also Proceedings of Bath Field Club.

hut circles, which have been examined. This is one of the earliest fortresses in the kingdom, and points to a very early occupation of this part of Britain, and to an amount of knowledge and skill in primitive warfare which is very often underrated.

If an early date must be assigned to this Camp, although Roman remains and coins have been found within it, the same early date must be assigned to Dolebury, as the structures of the two are similar.

Each wants the regularity and plan of a Roman fortress. The position in either case is not that which would have been selected by a Roman force, nor the dwellings such as would have been occupied by Roman soldiers.

The form of the rampart at Dolebury is very irregular, and the work unscientific as to structure. There is in Roman work a regularity and order, and attention to form and measurement, which these early fortresses do not possess.

It is not improbable that roughly hewn timber, with projecting branches, may have largely entered into these defences. We know that the Gauls used timber in constructing their walls, which gave them great strength and power in resisting the battering ram, as Cæsar * mentions, and in the walls pictured on the column of Trajan at Rome, and of that of Antonine, timber is seen to be inserted.

The walls of our British ancestors probably partook of this character, though not so scientifically constructed. There are three, or rather there *were* three, Camps on the Bristol Avon, two on the Somerset, and one on the Gloucester side of the river, at Bristol, which differ in construction, but serve to show the antiquity of that at Dolebury.

The destruction of the strongest and most perfectly fortified of these, that called Borough Walls, overhanging Nightingale Valley, revealed the construction of the walls. It had a triple

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* Lib. vii., c. 23.

rampart formed of loose stones, the principal rampart being run together with lime, so as to have a solid mass of concrete in the centre. This had been produced by mixing the lime-stones with brushwood, which was set on fire, and then when heated, water was poured in, or the smouldering mass left open to the rain, and then fragments of stone cast in, so as to form by degrees a solid mass of concrete, which could not be dug through.* The whole was then banked up with earth and stones, and probably a palisade planted on the summit. All this has now been cleared away, and we cannot but regret the loss of so interesting a structure. Hardly any trace of it now remains.

There is no indication of such a method being followed at Dolebury; here the rampart is entirely formed of loose stones piled together in rough masonry, after the manner of the Worle Camp.

The other Camp at Stokesley Slade, on the opposite side of Nightingale Valley, has a curving rampart which cuts off an angle of the ground, formed entirely of loose stones, and resembles that at Dolebury, and there seems to be no trace of lime; this is probably the more ancient Camp of the two. The third, that on the Clifton Down, has indications of lime and more regular walling, it has also a small inner fortified portion at the angle on the north-west side, as is the case at Dolebury. These Camps protected the navigation of the River Avon, and are no doubt of different dates. The number of the Archæological Journal for September, 1880, contains an article on earthworks by a well-known antiquary. He has cited Dolebury as an example of ancient British work, but gives it the name of *Roborough*, which is the name of the village on the southern side of the ravine but not of the Camp. Dolebury and Roborough are separated by the deep valley of which I have spoken; an account of Rowberrow or Roborough will be found in Collinson's History

* The construction of the rampart resembled the vitrified Forts common in Scotland. (For an account of some of them see Arch. Journal, vol. xxxvii. p. 227.)

of Somerset, vol. iii., p. 599. Collinson in describing it says, "The vast rocky encampment of Dolebury rises on the north, and forms a romantic outline," but he does not mention a very fine Barrow which is beyond the Church at Rowberrow, farther south towards Shipham, and may have been a burial place to the Camp, or the monument of some ancient British Chief. Mr. Clark justly remarks that "on the great ranges (of hills), as Mendip, Cotteswold, and the Chilterns, and the hills on the Welsh border, the Camps are almost all of a large area, containing twenty to even sixty acres. Worle contains 18 acres . . . . Hamden Hill Camp in Somerset is 3 miles in girth, Cadbury covers 25 acres; Roborough (by which he means Dolebury) is of immense size and strength. It is evident that almost all these Camps were intended to accommodate a whole tribe, whose hunting grounds lay in the wooded plain below, and looking to the immense labour bestowed upon them, and to the quantity of black mould within them, they must have been intended for permanent residences, and so occupied, possibly for centuries." I have little doubt that this is true of Dolebury; although there is no spring of water within the Camp, yet at the foot of it, below Rowberrow, there is a streamlet by which water would be supplied, whenever the stock of rain-water, usually stored in reservoirs lined with clay, within the Camp, should fail. From this brook at the bottom of the valley there is a winding road up the hill side, which is protected in part of its course by earthen mounds.

Mr. Clark observes that by far the greater number of British Camps were thrown up at a remote period. There are other camps that crown the Mendip Hills, but none so large or perfect as Dolebury. There is a camp over Burrington village, commanding the pass up the Combe into the Mendip, and this is fortified by a single rampart and ditch, the rampart being of loose stones and the form nearly square. At one point the rampart is left unfinished. It has more the appearance of a

Roman camp, and is much inferior in size to Dolebury. Roman remains* have been found in it, as well as in the caverns in the Combe below, but still more ancient interments have been found in one of these caverns. The hills around are scarred on all sides by the ancient workings for lead, which was worked out by the Romans. To the south of these camps runs the Roman road which traverses the Mendip Hills from Brean Down, an ancient port of the Romans, on the Severn, and where earthworks exist, and Roman remains have been found.† This road was surveyed and planned for Sir R. C. Hoare, who has given its course and the camps that lay on it. The earliest pigs of lead bearing the Roman stamp have been found along its course. The first in date bears the stamp of Britannicus, carrying us back to the reign of the Emperor Claudius.‡ It was in that reign that this part of Britain was brought under Roman rule, and it seems probable that the lead was known to the ancient Britons before the coming of the Romans and worked by them. From Claudius to the Antonines we have evidence of Roman workings in the pigs of lead bearing the imperial stamp, in the coins and seals,§ and abundance of other Roman remains, which have been discovered in the process of uncovering the sward to obtain the refuse of the old Roman mining operations. This has been re-smelted in modern times and sufficient lead obtained to render the labour profitable.

Dolebury Camp is in the heart of the workings, and was probably the stronghold of the people or tribe that tenanted these hills and held the valley below, subsisting their flocks and herds on the sides of the Mendips, and occupied in collecting the lead, which is proved to have been very near the surface. The

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* See Phelps' Somerset, vol. i., p. 26.

† See Hoare's Ancient Wilts, vol. ii., p. 42, 43.

‡ See Journal of Archæological Association, vol. for 1875, p. 136.

§ See Reports of Cambridge Antiquarian Society, vols. 1878-80.

Romans when they had obtained possession of Somerset probably put these workings under tribute and improved the manner of working the ore.

The Roman road throughout the Mendips passes on into Wiltshire and is traced to Old Sarum.

The spot where Roman remains have been found most abundant is at Charterhouse on Mendip, about four miles from Dolebury.* Here are traces of a Roman Camp not far distant from the present smelting works, and a small Camp Amphitheatre on the south side of the hill, about a quarter of a mile from the Camp. Very little remains of the Camp, but enough to show it was of the ordinary oblong form with a bank of earth cast up out of the surrounding ditch, and this had been crowned by a palisade. It is in the open ground in the valley, and in structure and position quite different to Dolebury, and enclosing not more than two acres of land. The Roman Camps along the line of Roman road are small and much less fortified than the older Camps on the tops of the hills.

The ridges of the Mendip are here crowned with Barrows which stand out in bold relief against the horizon. The most remarkable are at Priddy, where are also circles of large diameter formed of earth, and which seem to be of a date anterior to the Roman occupation, and indicate a population of considerable extent, dispersed along the ridges of the Mendip, of which Dolebury was probably the stronghold and primitive fortress.

The Beginnings of the Bath Newspaper Press. *By* HAROLD LEWIS, B.A.

(Read Jan. 18th, 1882.)

Though my colleague, of whose censure we all stand in wholesome dread, is constantly remonstrating against the preponderance of the antiquarian element in the Club, there is, I

* The manager of the mines, Mr. Rogers, has formed a very interesting collection of Roman remains found around Charterhouse.

venture to think, a large amount of work yet to be done, in this department, towards elucidating the history of Bath. Warner did not exhaust the subject, it would be nearer the mark to say he only opened it, for since his day much more critical and scientific methods of studying the records of the past have come into use, and these afford unlimited scope for original investigation. One illustration will suffice to explain my meaning, the patient search by which Mr. E. Green exploded the accepted notion that Queen Elizabeth visited Bath in 1592, and showed that her visit was in 1574.* There are many other pleasant bye-paths of inquiry with regard to the people, the places, the buildings, the events and the institutions of the past, which may be followed with advantage; the facts lie scattered in different directions, and only require a little industry and perseverance to collect them together and add materially to our general store of knowledge. Moreover "'twere well 'twere "done quickly;" the memorials and landmarks of the past disappear in these days with mournful rapidity, and what is here to-day is gone to-morrow.

One such field of inquiry, which is at present almost virgin soil, is the literature of Bath. The special interest attaching for centuries past to the city and its springs has caused a remarkable number of works to be written about them, many by eminent and clever men, and in addition the list of books printed at Bath is not inconsiderable. A bibliography of Bath is, I believe, in the hands of one of the most valuable members of our club, and there is much that might be collected about Bath books and Bath authors by a local William Blades. One would like to see done for Bath what Mr. Robert Davies, F.S.A., has done for York in his "Memoir of the York Press with notices of authors, "printers and stationers in the sixteenth, seventeenth and "eighteenth centuries."† The paper which I offer to-day may

* Proceedings of the Bath Field Club, vol. iv., p. 105.
† Westminster: Nichols & Sons, 1868.

be reckoned as a chapter of such a memoir not, I hope, altogether without interest, for it will put on record some facts not generally known, and will correct two or three current errors.

The modern newspaper had its classical prototype in the "Acta Diurna," or "Acta Publica," an official gazette which during the late republic and the empire appeared daily under sanction of the Government, and had very much the character of our "London Gazette." After the invention of printing news sheets first made their appearance in Germany and Venice. The "Notizie Scritte," first issued by the Venetian Government in the sixteenth century, with accounts of the wars of the Republic and other events of general interest, were at first not printed, but allowed to be seen in certain places on payment of a small coin, called a *gazeta;* hence the name "Gazette."

The earliest English newspapers or newsletters belong to the reign of James I. and were printed in small quarto. The "English Mercury," purporting to be published by the authority of Queen Elizabeth in 1588, is a forgery, and the first weekly publication was "The Certaine News of the Present Week," edited by Nathaniel Butter, and issued in 1622 to record the progress of the Thirty Years War. Similar publications multiplied during the Civil War, but they were brought out rather to gratify the fierce passions of the time than to disseminate news. Sir Roger L'Estrange may be considered the father of the existing newspaper press, for he started in 1663 "The Public Intelligencer," which was dropped upon the appearance of the "London Gazette," which has been published continuously since November 7th, 1665, and is the oldest English newspaper.

Of course, much earlier in the history of printing, the art was made to gratify the public curiosity with regard to contemporary events, and we may see the first gropings towards the idea of a newspaper in the *chap* books; small, rough pamphlets, recording, with comical simplicity and terseness, prodigies and wonders, to gratify the same taste as that for which the "Daily Telegraph"

now-a-days has created its peculiar style of sensational journalism. Later on pamphlets of a better type recorded news of importance. To show how this was done I may quote the title of one relating to Bath, which is preserved in the British Museum. It runs :—

"A Fuller Relation of the taking of Bath by Sir Thomas Fairfax "his Forces; with the condition of the surrender, Sir Thomas "Bridges, the Governour and officers gone to Bristoll

"Taken therein

"200 prisoners

"200 armes

"6 pieces of ordnance

"10 barrels of powder

"10 barrels of match and much ammunition

"Divers heaps of bullets

"Great store of beefs, corns and other provisions

"The standard colours upon the Fort Royall and all other colours in "the Town

"Published by Authority

"Printed for Thomas Bates at the signe of the Maiden Head on "Snow Hill neere Holborn Conduite 1645."

It will be seen that the system, universal among American newspapers, of giving the cream of the news in a series of boldly displayed headings to a telegram, is no novelty. "The Relation" consists of a letter from a gentleman dated "Combe neere Bath," giving a very vivid and spirited description of the easy capture of the city, very much in the style of a modern special correspondent. The latter is indeed only a revival, for after the Restoration the gossip of the Court and the coffee houses used to be retailed to the country parson and squire by the writer of news letters, just as the London correspondent writes to the provincial papers of the day. This practice is ridiculed in the old play "The Stranger."

The provinces however were not long without their newspapers. London had its "Gazette" in 1665, Edinburgh followed in 1690, and "Berrow's Worcester Journal" was started in the same year, the "Stamford Mercury" five years later. Ten other still existing

newspapers were started in the first quarter of the 18th century. Bath, so far as is known, was nearly twenty years later in getting a paper of its own. In the meanwhile its wants were supplied by a city with which it has now no special connection—Gloucester. Robert Raikes, well remembered as the founder of the Sunday Schools, started in 1722 "The Gloucester Journal with the most "important Occurrences Foreign and Domestick" I have upon the table three volumes containing the numbers for the years 1734 to 1740.* Raikes boasts therein of the extent to which his newsmen circulated his paper, and they appear to have covered a district extending as far as Taunton on one side and Salisbury the other. This "Gloucester Journal" gives the Bath news almost as fully as the regular Bath papers for many years after, and it is exceedingly interesting for its contemporary accounts of the visit of the Prince and Princess of Wales in 1738, of how the Prince promised the city a solid gold cup, and how, after many delays, a silver gilt one was obtained by the pertinacity of Nash. It also records the erection of the obelisks in the Orange Grove and in the Queen Square, and members of the Bath and County Club may like to know the wonders of the latter structure :—†

"Yesterday an *Obelisk* was begun to be built in the Center of *Queen* "*Square*, in Honour of *His Royal Highness the Prince of Wales*, at the "Charge of Richard Nash, Esq.; Its Height is to be equal to that of "the Obelisk described by Pliny, erected in the ancient City of "Heliopolis, by Rameses the then reigning King of Egypt, when Troy "was taken, namely, sixty Egyptian Cubits, which exceeds the "Altitude of the famous Obelisk before St. Peter's Church at Rome. "This Obelisk is to be in the Form of a *Ray of the Sun*, the Egyptians "dedicating to that Luminary these Sort of Monuments, in Token of "some great Action, or some extraordinary Cure; and under this "Shape, instead of a Statue, the Phœnicians worshipped the Sun; "the Grecians following the same Example, paid their Adorations to

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* Lent by Mr. William Lewis.

† Gloucester Journal, Nov. 28, 1738.

"Venus at Paphos, Jupiter Melicnius at Corinth, and divers others "of their Idols under the same Figure ; by which you may see the "Bath will soon show an exact Pattern of one of the most eminent "Monuments of Antiquity."

The first Bath newspaper of which there is any record is the "Bath Journal" of which the second volume lies upon the table.* It is commonly stated and believed to have been founded in 1742. But this volume proves distinctly that it was founded in 1744. The first number before you is stated to be "No. 1 of Vol. 2, No. 57 weeks since this Journal was first published," and it is dated "Monday, March 25th, 1745," so that the first number must have been issued on Monday, February 20th, 1744. By the courtesy of Mr. Alfred Keene I have been allowed to examine the files preserved at the office; they are unfortunately not quite complete, some volumes being missing, among them the first, so that I do not know of any earlier copy in existence than that before you. The title is "The Bath Journal, printed at "Bath by Thomas Boddely, where all manner of printing is done "very reasonable." It is a small four-page paper, with three wide columns on each page, set in old style type, and very well printed. This volume, and those for some years following, have an index and a title page printed in red, which was given gratis to subscribers at the end of the year; this will show how much scarcer newspapers were then than now. Its contents consisted of news, and advertisements of property to let and sell, and of medicines retailed by the printer and his newsmen. Of the leading article, or any sort of editorial expression of opinion there was none, until the present century had well begun. During 1745 the "Journal" quoted from the "London Evening Post" some jeering paragraphs at the expense of the army, and upon auspicious occasions in the history of the Royal Family the editor burst forth into expressions of loyal congratulations.

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* Lent by Mr. William Lewis.

Though there is often an obvious bias in the tone of the paragraphs of news, which would be avoided, by a careful sub-editor, in these days of more fully developed journalism, the paper cannot be said to belong to any political or religious party; the power of the press as an organ of public *opinion* was unknown at the time we are considering. The news was mainly taken from the "Gazette" and other London papers, and it was regarded as a great enterprise to have an express which should anticipate the arrival of the post. The Bath news consisted of a few paragraphs mentioning arrivals, deaths, marriages, and certain local events with aggravating terseness. I will only be tempted to give you two quotations, which will show you how curiously they recorded marriages in those days.

Under date Oct. 21st, 1745 :—

Marriages. Sir James Aston, of Ormskirk, Bart., to Miss Halworth, an agreeable young lady with a fortune of £15,000.—Paul Venner, of Swallowfield, Esq., to Miss Sally Mann, with £10,000 fortune.

Again a week later :—

Married. William Peston, an eminent whalebone merchant, to Miss Nancy Elers, an accomplished young lady with a fortune of £15,000.

The office of the "Journal" has, according to tradition, always been where it is now, and it must have been one of the first buildings in the Kingsmead fields.* On Oct. 8th, 1750, mention is first made of "Kingsmead street," and on December 17th the name of the sign, usual in those days before the present plan of numbering streets had been adopted, is added "The Pope's Head in Kingsmead street." The volumes for 1756 and 1759, which would record the death of Thomas Boddely,† are unfortunately missing,

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* For proof that the tautology of "mead" and "fields" is correct, which was questioned when the paper was read, one may refer to Sheridan, who invariably speaks of "the Kingsmead fields."—See "The Rivals," Act iii., 4, Act iv., 3.

† Stored away in a chest in the tower of Walcot Church are the dismembered pieces of a handsome brass chandelier, which was taken down when gas was introduced and consigned to unmerited oblivion. Five arms, terminating in

and the next number we have, that for January 2nd, 1758, is entitled "Boddely's Bath Journal, printed for John Keene, brother-in-law "of Thomas Boddely, deceased." From that day to this it has remained the property of John Keene and his descendants. On March 8th, 1773, it was published as "The Bath Journal," the name of Boddely being dropped, but not until January 7th, 1822, did it appear as "Keene's Bath Journal." From about 1779, the proprietors were "John Hooper and Thomas Keene,"* then "Hooper and Keenes."† Hooper's name disappears with the century.

The next paper is one that has not lasted, "The Bath Advertiser, by Stephen Martin," which was commenced on Saturday, October 15th, 1755. The earliest number I have seen is No. 5.‡ On this the position of his office is not indicated, but on October 30th 1765, the additional words appear, "at the printing office just without the West Gate." The appearance of the paper is inferior, and, from what subsequently occurred, Stephen Martin must have been something of an adventurer and decidedly unscrupulous. In October, 1760, he changed the day of publication from Saturday to Thursday, and changed the title of his paper to "The Bath Chronicle, or Universal Register." On Thursday, September 15th, 1763, it was called "Martin's Bath Chronicle."§ How much longer it went on I do not know.

The reason of Mr. Martin's change from "Advertiser" to "Chronicle" was that another printer named Cornelius Pope had put forth proposals for a Thursday paper to be called "The Bath Chronicle." You have before you the first number of this

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candle sockets, seem to have radiated from a brass globe which was suspended by chains from the roof. Beneath was a smaller globe, and below all hung a dove, the emblem of the Holy Spirit. This chandelier is inscribed, "The gift of Thomas Boddely, printer of the city of Bath, 1754."

* Bath Journal, Feb. 15th, 1779. † Bath Journal, March 27th, 1800.

‡ Lent by Mr. William Lewis.

§ Notes and Queries, 4th S., xi., 358.

paper published on Thursday, October 16th, 1760, and entitled "The Bath Chronicle and Weekly Gazette, printed and published by C. Pope and Co., at the printing office in Stall "Street, where printing in all its branches is performed on the "most reasonable terms and in the neatest manner."* The price was twopence halfpenny. In this number is the following notice :—

The Public are desir'd to be careful to ask for the BATH CHRONICLE AND WEEKLY GAZETTE, *published by* C. POPE *and Company, as the Proprietors of the* BATH ADVERTISER *(a Saturday paper) having altered their Day of Publication to* Thursday *since our Proposals were first distributed and likewise pirated Part of our Title, viz.,* BATH CHRONICLE. *We therefore give this necessary Caution lest they should attempt to impose* their Paper for this. *As to the scandalous invectives published this Week at the Bottom of their Proposals we think them unworthy notice; we shall endeavour to fulfil our Promise to the Public, and if we are found to deserve encouragement we make no doubt of receiving it notwithstanding all the arts that* envy and malice *can suggest. We are resolved never to answer any of their Publications nor for the future take the least notice of them.*

The former part of this notice appeared at intervals until March 18th, 1762.

The addition "Co." was dropped without remark on November 5th, 1761, and on the 26th of November the title was changed to "Pope's Bath Chronicle." This Cornelius Pope, as he states on the title page of his first paper, "served his apprenticeship to the "late Mr. Boddely, and has had the sole management of the "'Bath Journal' these last four years." He and Mr. Keene seem to have quarrelled in parting for they got to wrangling in print ;† what Mr. Keene said shows that Pope had held a responsible position in his employ and had kept his work-books. On Oct.

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* Lent by Mr. C. P. Russell, librarian to the Royal Institution, who possesses a complete file from the beginning to the present day.

† Bath Chronicle, April 15th, 22nd and 29th, 1762; Bath Journal, April 12th, 19th and 26th, 1762.

17th, 1765, Pope removed his office from Stall Street to S. James's Street. This was the corner house, facing S. James's Church and Weymouth House. Here the office remained for many years, and later on the words "next the Church" were introduced into the ornament on the title, a motto which now-a days would be taken in two ways. On August 4th, 1768, the paper appeared as "Archer's Bath Chronicle,"* and we find by advertisement that Pope having given up business in Bath, and intending to reside elsewhere, had sold the concern to William Archer, who had been his manager for two years. On September 29th, in the same year, R. Cruttwell however became his senior partner, and the title was changed to "The Bath and Bristol Chronicle (late Mr. C. Pope's)," but the attempt to command Bristol was soon given up, and the existing title, "The Bath Chronicle," assumed on September 13th, 1770. On October 5th, 1769, William Archer retired from the business, having taken the White Swan Inn at Devizes. R. Cruttwell was a very good printer, "Warner's History of Bath" and "Collinson's History of Somerset" being among the works that issued from his press.

It is currently stated, on the title of the paper at present and elsewhere, that "The Bath Chronicle" was started in 1757, but the number before you marked "Vol. 1., No. 1," incontestibly proves that it was started in 1760. It is curious that in this case as in that of the "Journal," such a mistake should have arisen, and I have been at the trouble to trace it out, with the aid of Mr. Russell. A little preliminary explanation is however necessary before it can be understood. Newspapers, it will be remembered, print at the top of the first page the name or title, and immediately beneath the date of publication. In the same line is usually placed the further information, "Vol. 00, No. 00." The volume, in the case of a newspaper, is always an annual one, and the figures should therefore indicate the number of

* In the possession of Mr. R. E. Peach.

years the paper has been published; the numbering the of separate issues is continuous from year to year, and indicates how many times the paper has been published, counting from the first number ever issued. It would be the duty of some person in every newspaper office to alter these figures; the first set he should only touch once a year, and the other he should carefully advance one for each publication. Bearing this in mind we shall be able to understand what happened. It appears that the paper had a very careless printer, who made several mistakes in altering the number. The volume for 1783 was properly Vol. 24, but he continued this marking through 1784, 1785 and 1786. The number for January 4th, 1787 he marked Vol. 25, and then he found out part of his error, and marked that of January 11th and the rest of the year Vol. 26, still leaving himself one in arrear. In 1794 he twice altered the number of the *volume* instead of the number of the *paper*.* Again in 1795 he once made the same mistake,† and once more in 1798.‡ These errors have never been corrected, and so the net result of the series of them is that the numbers of the volumes are three ahead of what they ought to be, and the consequence is that the year of establishment is wrongly put back to the same extent, from 1760 to 1757.

The next paper I have to mention is "The Bath Courant, printed and published by W. Gye and J. Salmon, at their

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* Thus the papers for the undermentioned dates are marked as follows:—

Thursday,	Aug.	7th,	1794,	Vol.	33,	No. 1714.
,,	,,	14th,	,,	,,	33,	,, 1715.
,,	,,	21st,	,,	,,	34,	,, 1715.
,,	,,	28th,	,,	,,	35,	,, 1715.
,,	Sept.	24th,	,,	,,	35,	,, 1716.

† Thus the papers for the undermentioned dates are marked as follows:—

Thursday,	June	18th,	1795,	Vol.	36,	No. 1757.
,,	,,	25th,	,,	,,	37,	,, 1757.
,,	July	2nd,	,,	,,	37,	,, 1758.

‡ Thus the papers for the undermentioned dates are marked as follows:—

Thursday,	May	24th,	1798,	Vol.	40,	No. 1902.
,,	,,	31st,	,,	,,	41,	,, 1902.
,,	June	7th,	,,	,,	41,	,, 1903

offices in Westgate street," which was started on Saturday, May 1st, 1773. I have only No. 7 to show you (no price is marked on it), but I believe it had not a long life. Gye was afterwards a stationer in Bath, the business now carried on by Messrs. Dawson having been Gye's.

J. Salmon appears some years later as the proprietor of a curious publication, which is not a newspaper but rather a weekly miscellany entitled "Salmon's Mercury."* The ornament on the title, with the motto, "Colligit ut spargat," is the same as appeared on the "Courier." There is one number dated "Saturday, December 20th, 1777," price one penny, then several issues without date or number, price "only twopence," which cannot be later than 1779, then they commence numbering at No. 4, though that contains "the twenty-fifth letter of a Turkish Spy," and at length No. 33 is dated July 2nd, 1779. The last number in the volume is 130, Friday, May 11th, 1781. J. Salmon was a printer, and his father, Tobias Salmon, a linen draper; they had both been tried for libelling John Jefferys, Esq., the Town Clerk, and the younger had a term of imprisonment, the elder being successful with the line of defence pronounced to be infallible by the elder Mr. Weller. This "Mercury," which was principally made up of cuttings beside, was the vehicle for fresh attacks upon the Town Clerk, some very offensive letters addressed to him by old Tobias being here printed. Salmon's "Mercury" was printed and published in Stall Street, and T. Sketchley was a joint proprietor until No. 18, when, as Bristol agent, he was described as T. Sketchley, auctioneer and appraiser, Register Office, 23, Clare Street, Bristol, so that the publication seems to have had a chequered existence.

In January, 1792, William Meyler put forth his proposals for "a third Bath paper." William Meyler was a bookseller in

* The property of Mr. William Lewis.

the Orange Grove, carrying on business where is now Miss Sturmey's fur shop. He was a man of culture and a poet, and numbered Graves, of Claverton, and many other distinguished men among his friends. He published No. 1 of "The Bath Herald and General Advertiser" on Saturday, March 3rd, 1792, and for the purpose of making it known circulated the first number gratis, but in No. 2 the price was fixed at 4d. It was printed by R. Paddock, Green Street, and consisted of four pages 17½in. by 11½in., each containing four columns of type.

Meyler had the same experience as Pope, but his notice was more amiable ; he said in his first number :—

In a late Address, announcing the publication of the BATH HERALD. *it was presumed, the great increase in the Buildings and Inhabitants of this City, rendered a Third Paper necessary. We were, it seems, not singular in this opinion ; for a numerous Co-partnership have judged a Fourth at least expedient. To this measure, which will serve to augment our industry, though it may lessen the fruits of it, we cannot object. The road to public favour is open to every man who has the ability to merit it. It is to be hoped, however, that the competition. in the present case, will proceed with equal spirit and liberality, and that the sole contest between the Rival Prints will be, which shall be made most useful and entertaining to the public.*

The paper here referred to was "The Bath Register and General Advertiser," also first published on Saturday, March 3rd, 1792. It was printed by J. Johnson, at No. 16, Stall Street, now Messrs. W. Titley and Sons' shop. Its editor states that he was "many years concerned as conductor of a newspaper in the western part of England." The proprietors however sustained a heavy loss by publishing at 3½d. instead of 4d., the then price of the other Bath papers, and a junction was effected with "The Herald," which on October 5th, 1793, appeared as "The Bath Herald and Register," and on June 20th, 1795, Mr. Meyler announced that he had purchased the whole property and interest in the paper. With the first number for 1800, the second title "Register" was dropped and the paper resumed its

original title "The Bath Herald." The small volume of the "Register" is interesting, as giving very full accounts of a dispute proceeding at the time between the Freemen and Corporation of the city, regarding the property of the former.

William Meyler was a member of the Town Council and Magistrate, and held office as Constable and Sheriff; he died of gout on Saturday, March 10th, 1821, aged 65, at his residence in the Abbey churchyard. I will not say more about him, as I hope his biography will be given the Club next year by the executor of the last of his family.

And now having described all the Bath papers I can trace down to the end of the last century, I think I have reached a very good point to draw the line between past and present, and to end my story.

Case of Abnormal Development of Wood in the Root of a Spanish Chestnut.

By the Rev. LEONARD BLOMEFIELD, M.A., F.L.S., &c.

(Read February 15th, 1882.*)*

This was the case of an excessive development of woody fibre, forming a large globular callosity round one of the roots of a Spanish chestnut in the Park at Bath. The tree had been planted, it is supposed, about 50 years, and had attained a girth of between 6 and 7 feet. In the autumn of 1881, one-half of the tree was seen to be in a dying state, the other half being still healthy and vigorous. The former had been noticed as in a failing condition for four or five years previous, and was so far gone at the time above-mentioned that it was determined to take the tree up altogether. When the roots were laid bare, the callosity in question was discovered on one of the roots on the *same side* as that half of the tree which was dying, showing a connection

between the two things. The callosity or protuberance was not above 3 inches under ground, and there was a distance of about 8 feet between it and the stem of the tree. The root to which it was attached, and which connected it with the tree, though of the above length, and extending a foot beyond the callosity, was very much below size, compared with the larger and stronger roots connected with that side of the tree still in health. The same may be said of some other roots adjoining the one with the callosity. All the roots on that side of the tree were in an unhealthy state.

The callosity itself measures 2 feet 6¼ inches in circumference; its length is 10 inches, and the diameter 9½ inches. Its form is not exactly globular, but approaching to pear-shape, one half narrowing at bottom, and reaching down the axis lower than the other half. Its present weight, in its dried state, is 13 pounds. When first taken up it probably weighed from 1 to 2 pounds more.

The circumference of the root just above the callosity is 7 inches; below, where it makes its exit from the callosity, the circumference is only 3½ inches.

The callosity having been sawn in half, perpendicularly down the axis, on examining the section, the course of the portion of the root above the tumour may be traced for 3¼ inches after entering it, and the portion at bottom may be traced upwards for near 4 inches. Neither can be distinguished further, each portion losing itself in the closely-compacted central mass of woody fibre, this last spreading out horizontally, in somewhat fan-shaped fashion, towards the circumference, at the same time passing upwards and downwards to encircle those portions of the root which still preserve their forms, though shut out from view externally. The successive layers of wood-growth are clearly seen in the concentric circles that undulate round the axis, these circles being traversed by extremely fine medullary rays reaching from the centre to the bark.

It would seem to be clearly due to the arrest of the flow of sap, by the dislocation of the ducts through this excessive development of woody fibre, that one-half of the tree, after languishing for a time, died. At the same time the sap, not moving onwards in its accustomed channel, would accumulate about the axis, and further tend to increase the development of the wood and the enlargement of the callosity.

Enquiring now into the probable cause of the above monstrosity, it does not appear to be referable to that class of hard woody excrescences, often found on the stems of certain trees and occasionally attaining to a large size, which have been so closely investigated by M. Trécul,* and also treated of by Mr. Berkeley in the *Gardener's Chronicle*,† under the name of "Knaurs." Both these authors agree in tracing the appearance of these hard lumps of wood to adventitious buds, one or more of which may often be observed at the extremity of the knaur when in its incipient state of growth. These terminal buds are always, in the first instance, "connected by a fibro-vascular system with the woody axis upon which they are seated." At some early period of growth the wood itself of the bud increases; changing its character, and passing into the form of a hard woody nodule. As this nodule enlarges it exercises a pressure upwards upon the bark, ending in a rupture of the slender duct connecting the bud with the woody axis, the bud itself becoming atrophied. From the time of this taking place the nodules keep increasing in size until a large knaur is formed. Dr. Maxwell Masters, who has briefly spoken of these abnormal woody growths in his "Vegetable Teratology," considers the nodules as originally "shortened branches, in which the woody layers become inordinately developed as if by compensation for the curtailment in length."‡

* Ann. des Sci. Nat. 3rd ser. (Botanique) tom. 20. p. 65.

† Gard. Chron., 1855, p. 756.

‡ Veg. Terat, p. 419.

In the callosity on the root of the Spanish chestnut above described, there is no appearance of any adventitious buds on its outer surface, though possibly there may have been some when the swelling first commenced. Nor are there any separate nodules to be seen like those in a knaur-- each having its own centre and its own concentric circles of woody layers; but the whole callosity is as one large nodule, the woody layers being all concentric round the axis of the root itself.

From these circumstances it may be inferred that the monstrous growth in question was not due to the same cause that knaurs are, but that more probably it had a pathological origin, all the roots on the side of the tree that was dying being alike unhealthy, and indicating constitutional derangement.

The two accompanying photographs represent the callosity—one entire, the other in section.

A Fact in connection with the Vobster Inversion. By Rev. H. H. Winwood, F.G.S.

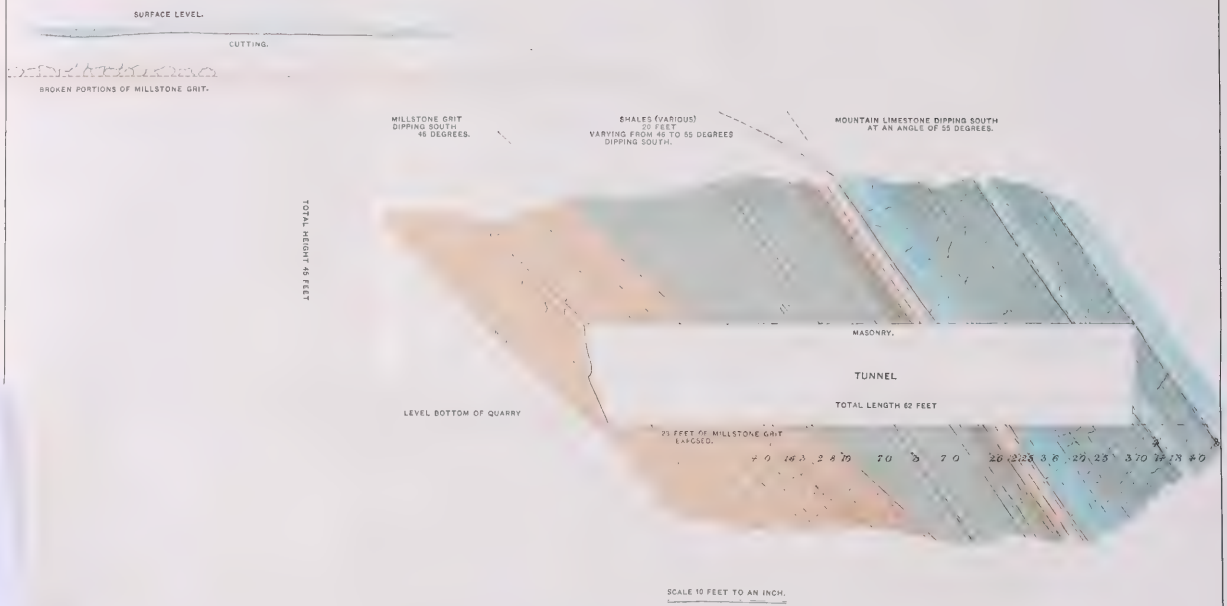
(Read February 15th, 1882.*)*

So much has been written upon the remarkable geology of the district immediately north of the Mendip Hills, especially upon that part lying between Holcombe, or Nettlebridge on the west, and Mells and Frome on the east, that an apology seems due from me to the Members of the Bath Natural History and Antiquarian Field Club for venturing to bring the subject before them again. Independently, however, of the ever-increasing interest which arises from the study of the causes which had a share in the formation of our so-called "everlasting" hills, a peculiar interest is felt by the geologist in trying to read the enigma and to unravel the complications which present themselves in studying the abnormal conditions of certain rock masses of the district in question. And if a fact can be established in connection herewith tending to the support of one theory or another, it is right that that fact should

VOBSTER QUARRY.

SECTION AT EASTERN END THROUGH TUNNEL.

BEDS DIPPING SOUTH


SURFACE LEVEL.
CUTTING.
BROKEN PORTIONS OF MILLSTONE GRIT.
MILLSTONE GRIT DIPPING SOUTH 45 DEGREES.
SHALES (VARIOUS) 20 FEET VARYING FROM 45 TO 55 DEGREES DIPPING SOUTH.
MOUNTAIN LIMESTONE DIPPING SOUTH AT AN ANGLE OF 55 DEGREES.
TOTAL HEIGHT 45 FEET
MASONRY.
TUNNEL
TOTAL LENGTH 62 FEET
LEVEL BOTTOM OF QUARRY
25 FEET OF MILLSTONE GRIT EXPOSED.

SCALE 10 FEET TO AN INCH.

FEBRUARY 14TH, 1882.

be made known. It is to establish a fact of this sort that these notes have been written. I will, however, if you will permit me refresh your memory as to the points which want clearing up.

The Mendip Hills, as you will see on looking at the map, run in a direction nearly east and west. The structure is an anticlinal one, *i.e.*, the beds incline on each side against a central ridge, of Old Red Sandstone; in other words they dip away in opposite directions from the centre, so that we have the Mountain Limestone beds on the south of the range dipping southwards, and those on the north dipping northwards; and not only so, but if we follow these beds northwards we find them gradually dipping at an increased angle until they are actually seen perpendicular, and then dipping southwards again, before they finally turn right over, and what was originally the floor when in their first horizontal position now becomes the ceiling. I said in their "first horizontal position," for that these beds were originally flat, and that some irresistible force must have moved them from their original position and tumbled them about, as we find them in the Nettlebridge Valley, is evident. How that force originated, and what was its action, has hitherto been, and still is, the problem to solve. Whether it was accomplished all at once by some mighty convulsion of Nature, which hurled the Limestone mass at Vobster (some 1,150 yards in length and 300 yards in width) a distance of 1,300 yards, or about three-quarters of a mile, from the nearest Limestone beds south of it; or whether it was a gradual and slow process of upheaval and squeezing together of beds to the southwards, and subsequent tilting up and inversion of the whole mass, is what we are trying to discover, and which it would have been worth a geologist's life-time, whilst pacing along the corridors of Time, to have seen. If it happened in the former way it would be called a catastrophe, or cataclysmic action, against which the learned of the present day set their faces. And yet even now we see a modification of extreme

views of this sort and the pendulum swinging back again, for to use the words of Professor Huxley, the extreme "Uniformitarianism" which Professor Ball attacks has long been as much a "creed outworn" as "Plutonism" or "Neptunism."* If in the latter way, it would be the result of processes carried on through the long lapse of past ages, similar in degree to what is constantly going on now in the crust of the earth, and would be called uniformitarian action, supplemented at the last by catastrophic action; for unless the earth's attraction was somewhat less in those days than it is at present, the point must at last have been reached when the beds lost their perpendicular or inclined position and tumbled over by the force of gravity. And so finally a catastrophe was brought about.

Having thus given you a sketch of the difficulties to be explained, I will proceed to the more immediate object of this communication.

In a paper contributed by Horace B. Woodward, F.G.S., of the Geological Survey of England, to the *Geological Magazine* for 1871, p. 149, and entitled "Remarks upon Inversions of Carboniferous Strata in Somersetshire," an attempt is made to explain the remarkable inversion of strata (indicated by the working of coal under the Mountain Limestone at Vobster) by a complicated series of folds and faults, and a very ingenious "Diagram section," on page 153, which it must be confessed is somewhat difficult to follow, is given in illustration of his view. Thus, whilst admitting this to be an inversion or turning over of the beds, he hesitates to accept the theory that the strata were so doubled over to the north as to bring the Mountain Limestone above the Coal Measures, and asks for facts to show that the main ridge was folded over. One of the difficulties which he thought had

*Nat., Vol. xxv., p. 241.

to be explained by those who advocate this view was the absence of Millstone Grit, which ought to occur between the Mountain Limestone and the Coal Measures. "No trace (he says) of this has been observed around any one of the three patches of Limestone" (p. 151). And in a note he refers to a letter from Mr. McMurtrie corroborating that view, or at least the view that Millstone Grit had not been detected between the Limestone and Coal Measures. Well, time goes on, these difficulties set brains thinking and hands working, and four years afterwards Mr. McMurtrie contributed to this Club one of those admirable and careful papers for which we have been hitherto so much indebted to him, "On Certain Isolated Areas of Mountain Limestone at Luckington, Vobster, &c.," read December 9th. 1874.* In these he brings forward facts, if not decisive of the question, yet contributing much towards our information on the subject. After describing the features of the district, he discusses the fault and anticlinal theory of Woodward and the "overthrow" theory of Moore and others. As to the fault theory, he shows that subsequent workings have proved that these faults do not exist so as to account for the upheaval of the Limestone through the Coal Measures. And in considering the overthrow theory he states that coal has been worked beneath these Limestone patches, which he thinks have been folded over from the range of the Mendips. But he states (p. 291) that after carefully examining all the three patches he had been unable to discern *in situ* either Millstone Grit on the one hand or Mountain Limestone shale on the other, but that in a field to the north of Vobster Limekiln he had found on the surface numerous stray blocks of Millstone Grit, not distinguishable from the same beds in Mells Park, and hints at the possibility that portions of this Grit may be *in situ* not far distant.

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* Vol. III., No. 3, of our "Proceedings," 1877.

I am able now to state that this has been verified. During one of the excursions of this Club in the autumn of 1880 to Vobster, after having examined a *drift* which had been carried through some Coal Measure shales, and whilst Mr. McMurtrie, Mr. Sandys, and myself were proceeding to join the rest of the members who had gone to Coleford for lunch, some infillings on the surface of the Limestone attracted my attention; on closer inspection these proved, to our delight, to be formed of Millstone Grit. In the "Summary of the Proceedings" of that year allusion was made to this as tending to throw additional light upon the geological puzzle of the neighbourhood, and it was thought worthy of being recorded at some future time more in detail, as an interesting fact to be added to the others accumulated by Mr. McMurtrie on this question. Since then, however, I have been fortunate enough to find much additional evidence in this direction.

The work of quarrying the Limestone for road metal and lime burning has recently been carried on very actively, and during a visit paid at the end of last October I found not only that the face of the quarry had been much altered by a large fall of rock and fire clay, calculated at about 40 tons weight, but that another one had been opened in the rear to the north. Access to this was obtained by means of a cutting about 5ft. wide, 6ft. deep, and 60ft. long; the rails for a small tram-car to run backwards and forwards were laid upon the upturned edges of the Mountain Limestone, and it had been cut through a "heading" composed of yellowish and reddish clay and Millstone Grit blocks distinctly and evidently *in situ*. There was no mistaking these to be a few stray blocks scattered here and there; they were of all sizes and shapes, from a large block 31½ inches long, 21 broad, and 10½ thick, to small fragments of a few inches. The blocks were angular or subangular, and had plainly been detached from their parent mass not a great distance off.

They varied in colour from pink to light buff, speckled with the usual iron-mould little dots, and were of varying texture, some harder and more silicious than others. That these fragments had not been subjected to much rolling action by water or otherwise was evident from their edges being but very little rounded, or their angles much abraded. If you ask me how they came there, my answer is—in the same way that the angular and subangular "headings" came in all our quarries around, a question still to be solved; ice, water, or atmospheric action and wear and tear, by one of these agents alone or by all three combined.

Did time permit, and were it within the scope of these notes, one might perhaps be inclined to dwell upon the second of these causes, and attribute the enormous amount of denudation that has taken place around (as evidenced by the thick and massive beds of Conglomerate that fringe these hills) to water action. Indeed mathematics have come to aid us much in our difficulty, and to Mr. G. H. Darwin, and especially to the Astronomer Royal for Ireland, Mr. Ball, who has supplemented and enlarged, perhaps somewhat too much, Mr. Darwin's theory, we are indebted for great help in their account of the important part the tides have played in the history of our earth. And if, according to Professor Ball, in the far distant ages of the Carboniferous period the tides were some hundreds of feet higher than they are at present, and swept over our heads some 500 feet above where we now stand, and if this mighty ebb and flow took place twice in the 24 hours instead of once, we see indeed that our tides are but the "feeble surviving ripples of those mighty tides" with which the ocean once pulsated. We have too a faint idea of the enormous power of this tidal planing engine, and may be less surprised and better able to account for the removal of so vast a mass of hard rocks.

I have yet more evidence to lay before you. On Friday last, in company with Messrs. G. Horner, McMurtrie, and Sandys, I

visited the quarry again, and further facts of the utmost importance had been brought to light under Mr. Batey's superintendence. The face of the quarry had been worked back at the spot where we had during the October visit found the infillings of Millstone Grit, and had exposed a good section of that rock resting on clays, and these latter on the Mountain Limestone giving the following section :—Clay and Millstone Grit *debris,* 6 feet; solid beds of Millstone Grit, 10 feet; shales of various colours, reddish and dark blue, 8 feet; total depth to top of Mountain Limestone, 24 feet. In this section the beds dipped steeply to the north, and were in their natural position. Some few yards to the east of this were several small step faults, and then a tumbled mass of clay and rock, beneath which a tunnel was being driven about 60 feet below the surface running directly north and reaching inwards to a depth of 20 feet. The men were then in the act, during our visit, of attacking a hard mass of rock which gave a ring seemingly not that of Limestone, and on close examination it proved that they had driven through the softer beds of blackish-blue, and reddish shale before alluded to, as resting on the Limestone to the westwards, and had just come upon the hard beds of Millstone Grit; these were dipping sharply to the south or south-west, about 45° to 50° in a direction beneath the superincumbent Limestone outside the tunnel to the eastwards. Thus these beds had been turned-topsy turvy without any doubt, and the Millstone Grit was found *in situ* between the Mountain Limestone and the Coal Measures, and so Mr. Woodward's chief objection to the overthrow theory, *i.e.*, the absence hitherto of any trace of Millstone Grit in this position, appears to me to have been met.

May I further state that not an isolated fact only, but two or three facts in connection with the Vobster Inversion have been brought before your notice, and if they have, in conjunction with the other facts made known from time to time by Mr. McMurtrie, in any way served to throw additional light

on the intricate geology of these parts, it will lessen my regret at having wearied you so long with a statement of these somewhat dry details.

It now only remains for me to allude to the courtesy of Mr. Batey, who has given me every facility in examining the strata during my visits to Vobster, and has kindly furnished me with those admirable sections brought before you this day in illustration.

Summary of Proceedings for the Year 1881-82.

MR. PRESIDENT AND GENTLEMEN,—

The anniversary meeting in the morning having brought the Club's Proceedings to a close, it has hitherto been the custom to commence the new year's work with a dinner in the evening. The amount of business having taxed the members' strength, it is considered necessary that additional vigour should be supplied and fresh energy started by a gathering of a social kind. This perhaps is well. At this dinner the officers of the Club are pleased to renew their acquaintance with members whose faces and presence they have missed ever since the last anniversary dinner, and who no doubt have the equal gratification of becoming acquainted with some of the motive machinery of the Club hitherto to them unknown. This feeling probably attracted the numerous company which on the 18th of February met their Vice-President and sat down to a well-served dinner at the Pump Room Hotel.

The Rev. Prebendary SCARTH presided on this occasion, and before proposing the usual toasts referred to the early struggles of the Club, through the exertions of a few earnest men interested in the subject of Natural History and Archæology. If a proof was wanted of the valuable work it was carrying on he pointed

to their annual number of "Proceedings," enriched by the contributions of such men as the Rev. L. Blomefield, Professor Earle, Mr Chas. Moore, Mr. McMurtrie, Mr. Green and others, and maintained that it supplied a need which no other existing society was capable of supplying in Bath and its immediate neighbourhood. He did not omit to mention the name of Mr. C. E. Davis, the City Architect, to whom they were indebted for a most interesting account of antiquities recently discovered behind the Pump Room, some of the most prominent in England. There was not any reason, he said, why the "Proceedings" should not become as valuable and instructive as those of the Bristol and Gloucestershire Archæological Society, which has risen into life within the last few years. How could this be better done than by interesting leading men, and inducing them to come forward and contribute papers on different subjects? Bath has a plentiful supply of capable men if they could only be brought forward. It was being perpetually replenished by fresh names, and what was wanted was this—that they should be induced to take an interest in their neighbourhood. He concluded by proposing "Success to the Bath Field Club," coupling with the toast the names of the Secretaries and Treasurer.

The Rev. H. H. WINWOOD replied by some pointed remarks on the work of the Club, and proposed the health of "The Contributors of Papers, and of the Dinner Committee." This toast having been responded to,

Mr. R. BIGGS said that though he was one of the members who was unable to attend the afternoon meetings, he looked forward to the publication of the "Proceedings" with great interest, and could assure the readers of papers that they had a much wider and highly appreciative audience which did not appear at the meetings.

Mr. HAROLD LEWIS proposed "The President," the state of whose health prevented his being present, and "The Vice-President," who had so admirably taken the chair.

The final afternoon meeting for the session 1880-81 was held on March 9th, but Mr. C. E. Davis's promised paper on "The Roman Baths of Bath" having, for some reason, fallen through, Mr. Wanostrocht read a paper on "Bitumen; its History and Origin," Mr. C. E. Broome being in the chair. The paper contained information of interest, but cannot be printed in full in our "Proceedings," as the author has already printed and circulated it amongst some of the members.

Mr. C. MOORE said the reader had given a great amount of information new to many of those present. The presence of bituminous shales had only been found in England during the last few years. It was not generally known that they had these shales in the Lias of their own neighbourhood, though not of any practical value. He differed from the reader as to the gaseous state of the centre of the earth, for he held a heterodox opinion as to the production of minerals. The members had been told that they came up from below; he believed that they came down from the surface, that they were not due to Plutonic, but Neptunic action. They knew that metals were held in solution though in small quantities, by the waters of the ocean, and he believed they were deposited in fissures in the ocean bed.

The Rev. H. H. WINWOOD pointed out that the reader had touched upon a disputed question in geology as to what bitumen was; some considered it animal, some vegetable, some an element, and some, with whom he agreed, that it was partly animal and partly mineral, for in no other way could its wide range be explained.

Dr. FALCONER then read an interesting paper on "Turner and Johnson, Physitions and Naturalists," which it was hoped would have been printed in the "Proceedings," but his recent lamented decease had prevented this being done. A black letter copy of Dr. Turner's "Herbal," printed in 1568, was exhibited.

The next afternoon meeting took place on 7th of December, H. D. Skrine, Esq., in the chair; when the President exhibited

the following rare captures made during the past summer and autumn in the neighbourhood of Bath :—

1.—A fine specimen of the *Kite* (Milvus ictinus), shot at Monkton Farley, in November. Had been seen hovering about the place for several days previous. Formerly common in England, but of late years become extremely rare.

2.—An adult *Red-throated Diver* (Colymbus Septentrionalis), taken alive in a grass field at "The Cloisters," near Bath, in an exhausted state, during the gale of wind on the 14th October.

3.—A *Spotted Crake* (Crex porzana), picked up dead on the rail near Kelston, with a deep cut across the breast, and supposed to have struck in its flight against the telegraph wires.

4.—*Arctic Tern?* (Sterna arctica). Several specimens shot on the river, near Dundas, during the autumn ; immature, and the species not determined with certainty. It is on record that large flocks of this species of Tern appeared in the west of England in the spring of 1842.

5.—*Black Rat* (Mus rattus). Several specimens obtained on sand hills near some old warehouses outside Bristol in May last. Common formerly, but now rarely met with except in a few old cities and towns.

6.—*Sirex gigas.* A specimen of this uncommon insect, one of the largest of the Hymenopterous order in this country, taken in a house in Union Street, Bath, was also exhibited ; followed by remarks on some other timber-eating insects, which occasionally make great havoc in the rafters of churches and houses.

This was followed by a paper on Dolebury Camp, contributed by the Vice-President *(Vide p. 1)*. It is hoped that the admirable survey made of that camp by Mr. Dymond, a photograph of which Mr. Scarth exhibited in illustration of his paper, will be reproduced in a succeeding number of the Proceedings.

On January 18th Mr. Harold Lewis gave a history of the beginnings of the Bath Newspaper Press *(Vide p. 8)*, the Secretary in the chair ; and the 15th of February was originally divided between Mr. Charles Moore and the Rev. H. H. Winwood.

The former was to have given a paper on "Eozoon and Micropalœontology," embodying some of his recent microscopic researches in the Palæozoic rocks, but death interfered, and the President kindly supplied his place by giving a lucid account of some abnormal vegetable growths, with special reference to that of a Spanish chesnut, recently growing in the Park, the specimen being on the table in illustration. *(Vide p.* 21.*)*

Mr. Winwood concluded the afternoon with a communication on certain remarkable geological features in the Coal Field, north of the Mendip Hills, and stated that he had recently discovered a "Fact in connection with the Vobster Inversion," which he thought worthy of a permanent record. *(Vide p.* 24.*)*

EXCURSIONS.

These have all been fairly successful this year. The first took place on April 26th, to the Roman Villa, at Bromham, of which Mr. Wallace Gill has kindly furnished the following notes :—

EXCURSION TO BROMHAM, 26TH OF APRIL, 1881.

Sixteen members left Bath by the 9.15 train for Chippenham, thence they drove to Bromham, a distance of about six miles, where they were met by the Rector (Rev. E. B. Edgell), who conducted them over the Church, dedicated to St. Nicolas, and evidently of an early foundation with a central tower and spire. The chancel, which was of Early English work, has been entirely rebuilt during the last few years. The Chantry Chapel on the south side of the chancel, called the Baynton Chapel, a gem of Perpendicular work, has an embattled parapet enriched with very elaborate panelling and a canopy at the east gable. The keystones of the windows are carved with figures, those at the east end representing the Trinity. The painted oak roof is remarkably fine and well preserved; its construction is very similar to that in the Hungerford Chapel at Wellow (illustrated in the Proceedings of last year), but the panels are enriched with

cuspings, and the soffits of the beams and the wall-plates are carved. In the centre of each panel is a shield with armorial bearings. There are some remarkable tombs in the Chapel, that of Elizabeth St. Armand having a richly-enamelled brass kneeling figure is specially notable. In the centre of the Chapel stands the altar tomb of Sir R. Jocotes, about 1492, with recumbent effigy in alabaster of a knight in armour, the base of the tomb being in Purbeck marble ; the inscription, which was on a strip of brass, has been removed. On the south side a fine tomb of Elizabethan date with a canopy over it, has some good brasses representing Sir Edward Baynton and his family. On the walls of the Chapel are hung some helmets and gauntlets of the 16th century. On the north side of the Church is the tomb of the poet, Thomas Moore. The party then examined the alms houses (1612), the Post-office and an early house opposite the Church, all of which are of half timber work, that opposite the Church being an especially fine specimen of the style.

The members were then entertained at luncheon at the Rectory house, and afterwards some of the party went to examine the remains of a Roman villa situated in a field at a short distance from the Rectory. This villa is almost two-thirds of a mile from the supposed situation of the Roman station of Verlucio, which is on the Roman road from Bath to Marlborough. The portion uncovered contains remains of two tesselated pavements adjoining one another with a running pattern in white, black, and red tesseræ. The figures were indistinct, but part of a fish and a serpent were traced. There are also traces of a hypocaust, and several pieces of flue tiles were found lying about, a boar's tusk, pieces of pottery, tesseræ, and iron slag. The villa evidently extended under the site of the present road, and possibly more would be found in the field on the other side of it. Leaving this villa the party drove to the top of Bowden Hill, where they examined the exterior of the old Conduit house which supplies Lacock Abbey. This building has

a stone roof with slabs overlying one another and moulded at the lap, and appears to be of 14th century work, and the doorway an insertion of later date; but Mr. Talbot (of Lacock Abbey) considered it to be the work of Sir William Sherrington, as the mouldings correspond with those in his work at the Abbey. The rest of the members here joined in, having walked through Spye Park. The next halting place was Lacock Abbey, where the owner, Mr. Talbot (a member of the Club), conducted the party round the outside of the building, describing the principal features, amongst others the roof of the cloisters very perfect and the masons' marks still distinct. The Abbey was founded in 1232 for Canonesses of St. Augustine, and converted into a manor house by Sir William Sherrington about 1540. The cloisters sacristy, and several other parts remaining untouched. Time compelled the party to shorten their visit, and to go away without seeing the inside of the building, and they returned to Bath by the 5.30 train.

Dr. Bird also contributed some notes upon the botanical features of the country. The spring, he said, was one of the latest known for years, very few insects or spiders being yet about. The trees, too, were not out in leaf, the sycamore buds only just bursting out; but the large Scotch firs, the yew trees, and hollies presented beautiful objects in the brown woods. The primroses were still in full blossom, and the cowslips and bluebells just coming into bloom. One plant not very common was gathered in blossom—*Erodium cicutarium* (Hemlock Stork's-bill). The word Lacock he considers to be derived from *lay*, a meadow, and *oche*, water; Bromham from Celtic *bron*, breast of a hill, and *hem*, a border.

WHITE SHEET CASTLE.

Either the prospect of a fine day on the Wiltshire Downs or the desire of escaping the rowdyism attendant on the Bath Races attracted a larger gathering than usual of the members on

Tuesday May 24th, for White Sheet Castle. Two breaks received the party at Frome Station, and rattled away through pleasant hedgerows and verdant woodlands to Maiden Bradley. Owing to the lateness of the spring the trees had hardly put forth their wealth of foliage, and the ash was seen far behind the oak, thus according to one interpretation of the old saying, indicating a wet summer. The first sign of the nearness of the Chalk downs was seen where the road after passing Maiden Bradley and leaving the Green Sand formation cuts through an outlier of the Chalk, when suddenly the whole expanse of rolling hills lies before you, chequered as they were with the flying shadows of the fleecy clouds. Seeking the accommodation for the horses afforded by the substantially-built outhouses of Rodmead Farm, the members, under the guidance of their Vice-President (Mr. Scarth), breasted the steep rise of Rodmead Hill in quest of the Camp ; not such an easy thing to find except by those well acquainted with the locality. After a pleasant and breezy walk, just as the energies of some began to flag, the Vice-President was seen in the far distance, standing out clearly marked against the sky-line ; the Camp was found and he was in possession of the outer rampart. Time having been granted for the stragglers to come up and for the enjoyment of the magnificent view over the vale of Blackmore, the three outer ramparts were followed, their entrances pointed out, and the attention of those present drawn to their semi-lunar form and the irregularity of their structure. Crossing over the inner enclosures the south side was seen to be formed by the precipitous face of the down, acting on this side as a defence in itself, and requiring a very slight rampart, so that the form of the Camp, as is customary in all these pre-Roman Camps, was regulated by the shape of the hill, the strongest entrenchments being drawn across as defences on that side of the hill (in this case the north) which was most open to attack. The circular enclosure near the centre of the Camp appears to have been made in recent times for a clump of trees, and not to be of any

antiquity. Leaving the Camp at the north-west side and the three tumuli on the left, the members returned to Rodmead Farm, the botanists on the way finding several plants of a pretty white *Cerastium* and *Orchis morio.* After lunch, which was found spread out under the shade of some trees, had been duly discussed, Mr. Scarth collected the members and read them some notes which he had prepared on the Camp.

This earthwork, he said, was situated about one and a half miles west from the classical ground of Stourhead, and at about the same distance north of Mere, in the ancient country of the Belgæ. It is not far from the line of the Roman road which follows the Mendip Hills from the port on the river Axe, and continues on to Old Sarum, passing near this Camp at Maiden Bradley. Though not forming one of the camps of the Mendip Hills yet it is one of a line extending from Dolebury on Mendip to Old Sarum in Wilts, and lies to the south of what was once probably the line of mineral traffic between Sorbiodunum and the port at Breandown. Probably existing before the Roman occupation, it is supposed, from apparent alteration in the ramparts, to have been strengthened in Saxon times. Alluding to the Camps of Dolebury, Maesbury, and Chesterblade, at the respective distances from each other of thirteen, six, and ten miles, as being pre-Roman, and yet as having been subsequently held by the Romans, he thought this also may have been the case with White Sheet, though Roman remains have not as yet been found there. This ancient fortress, the form of which, like all those of an early date, depended more upon the strength of its position than the skill of its defenders, contained an area of 15 acres, and probably marked the progress of the Belgic conquests and subsequent occupation. Details of its form having been given from a plan in Sir R. Colt Hoare's "Ancient Wiltshire," Mr. Scarth seemed inclined to connect it with the excavations about three miles to the south-west, called Pen Pits, which, he said, seemed to have been quarried for ages to obtain the stone found there and used for millstones, &c.

This gave an opportunity to the Secretary to introduce Mr. Kerslake who had joined the Society as a visitor, and to call upon him as the writer of an able pamphlet, entitled "A Primæval

British Metropolis," to state his views as regards "Pen Pits," which he considered as the site of the long lost Cair Pensauelcoit. It is needless to state that this caused a brisk passage of arms between Mr. Kerslake and the Secretary, Mr. Scarth having slily thrown down the apple of discord between them; the former contending strongly that these excavations were formerly human habitations, the latter that they were simply quarries. Both of course left off with the firm conviction that his opponent was quite wrong, and the discussion was ended by a friendly chat on other subjects as the break conveyed the members on the return journey home by Maiden Bradley. Here a halt was called to examine the Church, consisting of a nave, chancel and two aisles—a Perpendicular south porch, a fine Norman purbeck marble font, a modern Jacobean parish chest, some good specimens of brackets and pulpit about same date, a hideous eastern window, some good north and south chancel windows restored after the ancient pattern (13th century), a fine marble monument to Sir Edward Seymour, Speaker of the House of Commons, some good Perpendicular corbels in south aisle, and remains of entrance to a rood loft. The tower has some good windows (15th century), an outside turret staircase and very large buttresses at the north-west and south-west corners. The churchyard is well kept as seems everything else in this very pattern of an English country village. The old hostelry with its Jacobean staircase and fine stone mantel-piece of same date was inspected, and finally Frome was reached after a pleasant day. Some of the party attended service in the parish Church, others visited Mr. Singer's curiosities, the only unpleasant part of the day arising from the tedious delays on the branch-line between Frome and Bath, but at last the towers and spires of Bath were welcomed standing out clear against the beautiful background of umber-coloured sky.

ROMAN VILLA AT BRADING.

On June 21st the members of the Club paid a visit to the

Roman Villa lately discovered at Brading, that has attracted so much notice, and which is now partially uncovered. The party left Bath soon after 10 a.m., and proceeded by rail through Salisbury to Stokesbay, crossing over to Ryde, and having procured a conveyance at the Pier Hotel, proceeded by the beautiful inland road which leads to Brading until they arrived at the site of the Villa. This is situated at Morton, about half-a-mile beyond the old town of Brading. The party reached their destination about 4 p.m. Here they were met by the Vice-President, who had left London the day before to be ready for the members on their arrival. The secretaries of the excavation committee, the Messrs. Price, had courteously written to their curator to give every facility to the members to examine not only the pavements and the remains usually shown, but the portions of the Villa lately discovered, and not accessible at present to general visitors.

The situation of this Villa is one of the most pleasant that could have been selected for a residence, lying under the cover of Brading Down to the north-west, on the slope below the Down, and commanding a fine view of Brading Harbour, and the level country towards the sea, and overlooking the growing town of Sandown. The river Yar flows into Brading Harbour, and here no doubt once rode the Roman fleet at anchor, and perhaps under the supervision of the tenant of the Villa. The buildings have covered a large extent of ground, but not so much apparently, as the Villa at Woodchester, near Stroud, ; though probably at Brading much more remains to be uncovered, as only the end portion of the Villa and one of the sides have up to the present time been examined. It is situated upon two different properties, divided by a hedge which runs through the centre of the Villa, and a portion of this hedge has covered one of the interesting pavements. The owners of these properties seem equally anxious in bringing to light the remains underneath the surface, and certainly the pavements well reward the effort. An

excellent *Guide* has been published by the Messrs. Price, which has reached a second edition, and contains not only a plan of the Villa but an engraving of one of the pavements and drawings of other remains found in the course of excavation. Excellent photographs are also to be procured on the spot. The subjects depicted on the different compartments are for the most part new, and are mythological. It is to be regretted that more Photographic details could not have been given in the *Guide*, but it is understood that they are being drawn and engraved, and will eventually be published with particular descriptions, as has been done in the case of Lyson's Woodchester.

The form of the Villa is that common to all large Roman residences, viz., three sides of a square and small chambers attached to the principal rooms. One of the rooms containing pavements is divided into two portions, each of which contains a beautiful design with distinct subjects represented.

The first pavement, accidentally come upon in tilling the land, represents a very unusual figure in one of the compartments or panels—a man with the head and legs of a cock, standing near a small house, which is reached by a ladder or a flight of steps; on the right of this are two griffins moving in opposite directions. Another panel contains representations of two Gladiators, one of whom (the Retiarius) carries the trident, and appears to have cast his net over the head of his adversary, but this figure is almost destroyed. In the centre of this pavement is the head of a Baccante with a staff. Many fragments of wall-plaster with fresco painting on it, as well as Samian ware and other pottery, were found on the floor of this chamber.

A corridor, extending about 50ft. in length, connects this chamber with another, and this corridor has in the centre of it a mosaic pavement with the figure of Orpheus with his lyre, seated and charming the animals with his music. These consist of a monkey with a red cap on his head, a fox, a peacock, and a coote. The monkey makes his first appearance in this pavement,

as we cannot recollect to have seen him represented in any of the designs hitherto discovered in Britain, though Orpheus charming the animal creation is a favourite subject for tesselated floors. The subject, though heathen in its origin, was afterwards adopted in Christian ornamentation, as may be seen in one of the catacombs at Rome.

One of the most perfect and interesting of the pavements is in the chamber to which this corridor leads. The apartment is divided into two portions—the masonry which supported columns, one on each side, still remaining in a very perfect state. In the centre of this division is a portion of pavement containing a figure supposed to represent the astronomer Hipparchus, as he has on his right hand what appears to be a sun-dial. Below this is a sphere or globe, to which he is pointing with a wand; on his left hand is a vessel, in which there appears to be a pen. This subject is also new, not having hitherto been found on any Roman pavements yet uncovered. In the eastern division of this room is a very perfect portion of the pavement having the pattern formed in the shape of the letter X, with a circular medallion in the centre, on which is depicted the head of Medusa. Four panels surround this centre; each of these contains two figures—male and female. In one the female figure is represented in the attitude of dancing while striking the tambourine, and the man holds the pan's-pipe in one hand and a shepherd's crook in the other. The man's dress is peculiar, as he wears short trousers appearing under his tunic or kilt.

In the next panel the male figure holds a double-headed axe, and the female is turning from him as if in surprise or fear, while a plant, apparently a vine, is twisted round both figures. The lower portion of this panel is destroyed. The next one is also defaced, the upper portion of the male figure being obliterated, except the legs, while the female is turning her back, and the lower portion of her covering is twisted round the legs, leaving the back naked. It is difficult to explain these

two panels, which seem to have a mythological meaning. The fourth is the most interesting, being a representation of Ceres presenting an ear of corn to Triptolemus, the inventor of the plough, which primitive agricultural implement he holds in his left hand, and extends his right to receive the reward of Ceres. Ceres is entirely draped with a close-fitting garment, while the figure of Triptolemus is quite nude. In the triangular spaces between these panels are represented figures blowing the neat-herd's horn.

The other division of this chamber, which also contains an interesting Mosaic, is nearly destroyed by the fall of the roof upon it, and only the western portion remains. This panel represents Perseus and Andromeda seated. Perseus is holding up the head of the Gorgon which lies slain at his feet. In the angles of this compartment of the pavements are depicted the four seasons, but the figure of spring has been destroyed. The remaining three contain female heads adorned with flowers and emblems suited to each season. The outer border of this portion of the pavement has the "Tau" cross worked in tessera, and an emblem, called the "Swastica," at the western extremity. These are the pavements as yet discovered, but more may still be found. They constitute the principal apartments in the central part of the Villa, and show much taste and refinement.

To the north-east of these is the hypocaust, with the chambers attached to it, and here seem to have been the baths of the Villa. They form the north-east portion, at the furthest extremity of which is the well, which has been cleared out, and much refuse, a human skeleton and animal bones, querns, pottery, &c., have been found within it; the depth is 80 feet and the water very good. It is cut through the hard sand, without any stone facing, and seems to have had small buildings round it, which is unusual. Between the chief rooms and the hypocaust there appears to have been a cold bath. Abundance of roofing tiles with their pins, as well as window glass and broken remnants of pottery have been found.

The three sides of the Villa probably enclosed a large court or garden surrounded by a portico, with an entrance gate, but this has not yet been found.

The south-western portion remains to be uncovered, and we can only hope that further excavations may reveal some altar or inscribed stone by which further light may be thrown on this interesting monument of Roman occupation. The coins hitherto found range from Domitian to Magnentius, A.D. 353, and therefore extend over a period of above 250 years. The Roman road passed from Brading harbour to the north of this villa, and traverses the down to the centre of the island, and seems to have passed on to Carisbrook, where another villa was discovered some years back, and the pavements of which are still preserved. Roman remains have also been found at Gurnet Bay, and traces of a Roman road, supposed to have traversed the island from that point to Niton and Puckaster Cove. On the opposite side another Roman road is said to be traceable beyond Carisbrook to the south-west, and is marked as passing over Bowcombe Down in the direction of Brixton, but as yet little has been done towards tracing Roman roads or investigating Roman remains in the island, and much remains yet to be found.

It is hoped that the present interesting discovery will quicken investigation, and give increased life to antiquarian research, which will undoubtedly be well rewarded.

After examining the Villa the members of the Club met in one of the rooms, where the Vice-President produced plans of other villas, explaining their general arrangement, and exhibited drawings of other pavements found in Britain.

The Club, after taking leave of the courteous curator, proceeded to the Church at Brading, and examined the architectural details as well as the interesting monuments of the Oglander family, and afterwards returned to Ryde where they spent the evening, and left for Bath the day following, some of the party taking the opportunity of visiting the Dockyard at

Portsmouth. (The Secretary is indebted to Mr. Scarth for the above notes).

COMPTON MARTIN AND CHEDDAR PASS, SEPTEMBER 13th.

By some misunderstanding as to the day originally fixed, this excursion did not take place, and was postponed to a future time.

BYE EXCURSION TO PORTSKEWET AND THE SEVERN TUNNEL.

As several members of the Club were desirous of seeing the works at the Severn Tunnel a bye excursion was arranged for Tuesday, October 11th. The wet and unpromising looking morning, or it may be certain tender appeals to the husband touching the hidden dangers lurking beneath the waters of the Severn, probably accounted for the small muster at the G.W.R. for the midday train to Portskewet. As events however proved this small number was quite sufficient for convenient guiding below ground. A short walk of about a quarter of a mile past the Black Rock Hotel after landing on the Welsh side brought the party to the small settlement which Mr. Walker, the contractor of the works, has founded for his colony of workmen. Owing to the civility of this gentleman every necessary preparation was made for the visit, and after certain indispensable changes or additions to the outward apparel six members were standing, candle in hand, ready at the shaft's mouth to descend below, under charge of a foreman, by name Talbot, every inch of him a man of the right sort. It happened to be the after-dinner shift, so that a little time was spent in allowing the workmen first to go down to their work in cagefulls of six at a time. At last the cage was ready for the visitors, and being duly loaded that curious internal sensation on suddenly quitting *terra firma* and dropping through the darkness was a new experience to those who now made their first descent. Landed some 200 feet below the surface, candles were lighted, and the members found themselves in a brick tunnel called the "drainage heading," which now is driven right under the Severn, and made with the object

of trying the ground and finally serving the purpose of draining the water that percolates through the workings. The "heading," which was driven about 40 feet below what will be the true tunnel above, is 7 feet square and rising 1 in 480 feet towards the lowest point under that part of the river called the "Shoots," will serve as a natural channel to convey the surplus water towards the pumping shaft on shore. Various openings in the brick lining, 3 feet thick, indicated that the Coal measures were here passed through, and it was no doubt owing to the presence of fire clays and Coal shale plainly visible through these man-holes that the "heading" has been already bricked so far; the more solid and safe beds of the Pennant rock coming in farther on not requiring this protection so much whilst the works are in progress, though ultimately the whole will be cased in brick throughout. After passing from beneath the protection of the brick roof, the sound of distant water dropping and splashing on all sides through the joints of the Pennant proved the necessity of water proofs. Distant lights moving about showed where the men were at work, and after a walk of some half-a-mile, a larger opening over head, balks of timber and centrepieces, pneumatic drills, and preparations for "tonite" charges, indicated that the "heading" had gradually risen to the level of the true tunnel and the base of the future rails, and that the sides and roof were being enlarged and prepared for the future brick arching. A point under the "Shoots" being now reached, and a distance of about three-quarters of a mile having been traversed, the "heading" becoming somewhat narrower and rendering stooping necessary, a return was made to the shaft. Some portions of coal vegetation in the Pennant, a bed of rolled pebbles in the roof, and strings of hæmatite iron ore in the sides were examined and specimens taken. The large pump was visited, and the workings overhead in the air shaft reached by ladders, and with pardonable pride our intelligent guide and foreman pointed out a harmless stream of water, confined now to a two-inch pipe,

which had recently been a vast body of water bursting in upon them from the land, deluging the works, and putting a stop to them for a time. It may be mentioned that the water issuing from the Pennant proved to be decidedly salt, more than brackish; hence the question, is this the result of the percolation of the Severn sea, some 30 or 40 feet overhead; or is it derived from the New red marls and sandstones of the adjoining strata, which are known to contain salt? The members were finally drawn up to land much soiled as to the outer man, but none the worse for their underground visit. The air, owing to the admirable arrangements of the exhausting-tube which draws off the bad air to the surface, was fresh and agreeable, and notwithstanding recent blastings, comparatively clear, and they felt much impressed with the importance of the works undertaken by Mr Walker—the magnitude, dangers, and difficulties in overcoming which the luxurious occupant of the first-class coach that hereafter may pass through will have but a faint idea—and wished him every success which his energy deserves. But if the hands which carry the work out are deserving of admiration, no less certainly must be the mind that conceived the idea. A tunnel 4½ miles long, one-half of which length will be under the Severn, connecting the industries of England and Wales, was the idea conceived by this mind in the year 1862 or 1863, and finally wrought out, shall we say, in 1886 or sooner. All honour then to Mr. C. E. Richardson, C.E., engineer-in-chief of these works!. The members had the opportunity of seeing him at the shaft before leaving the ground, and from his paper given on a former occasion to a sister club the following section of the beds passed through in descending order at Portskewet is taken:—Sand, Yellow sandstone, Red marl, Conglomerate, Pennant, Clay shales, Coal shale (tunnel level), Millstone grit shale, Limestone.

After returning above ground a walk was taken, under the guidance of Mr. Kenway, to the brickworks, where from clay dug upon the spot the bricks for casing the tunnel are made. Very

large crushing mills have been erected and are driven by a powerful engine. The visitors were then shown the machine by which the bricks are made, six at a time, with great rapidity, and were then conducted through the drying shed where the warmth of the atmosphere, increasing as they walked to the end, very much puzzled one of the visitors until he was told that there were flues underneath, and he was approaching the end where the fire was. The same lively imagination on being shown the bricks in course of erection in the kiln inquired whether it would be possible for him to remain there and watch the process of burning, but on obtaining further information he abstained from trying it. It was stated that these bricks would bear a weight of 120 tons before crumbling, the usual Staffordshire test being 40 tons. On the way back the Roman camp, partially eaten away by the Severn, and the ruins of a Decorated chapel were examined. Bath was reached at 7.17 after a most enjoyable day.

WALKS.

The monthly walks have been organised by Mr. Herdman with much industry, but the attendance of members has been very small. Siston and Pucklechurch was the object of a walk on the 1st of November. Train was left at Warmley and the Church at Siston visited. The principal points of interest are the fine Norman doorway, the font with its leaden body supported by a stone pedestal, the chained books, and general dilapidated look of the whole building. Another point calling for remark was the inaccessibility of the fine old deserted Court. A walk across the fields to Pucklechurch took the members to Dods, or Ashfield Farm, where, by the courtesy of the present tenant, permission was granted to see the fine oak Jacobean staircase. After inspecting the Church they lunched in the village, and the cold rain which began induced them to return to Bath by rail from Mangotsfield instead of walking over Lansdown, one member alone being sufficiently brave to adhere to the original plan.

The Saxon chapel at Bradford was the object of another monthly walk on December 6th. Train was taken to Bradford, and after seeing the Church and Chapel (a rather bad settlement in the north wall was observed in the latter) the road was followed by Monkton Farley to Bath.

The Roman Villa, lately re-discovered at Box, was visited on Jan. 3rd. These remains have been long known to antiquaries, and are alluded to by Mr. Scarth in his "Aquæ Solis." They are situated in the garden of a small house called Springfield Villa, immediately east of the Church. Owing to the recent decease of the proprietress, who appears to have been unwilling during her lifetime to have them uncovered, her executors, Messrs. Stier and Warwick, have done a good work in bringing them to light again, and giving every facility for the public to inspect them. The remains consist of three semilunar baths, a hypocaust, the brick stelœ supporting the floor, hot-air flues, a tesselated floor or passage, 30 feet long by six feet broad, and the capital of a Roman column. The pavement, with the usual rectangular pattern composed of tesseræ of blue and white Lias, was in excellent preservation, as also was the crescent-shaped bath immediately to the south-west. The peculiarity of this bath, probably the cold bath in the *frigidarium* (as there was a channel for the water in the bend of the crescent, and a leaden pipe with 3in. bore in the north corner to carry it off), was the fact of its sides and floor being lined with white Lias tesseræ, and must of course have been water-tight. The depth was 4ft., the cord of the bow 4ft. 6in., and the width from front to back 7ft. 6in. Several visits were paid to these remains during the weekly walks of the Club, and much credit is due to Mr. Warwick for the labour and intelligence he has shown in the excavations, and the courtesy extended to the members during their visits.

The last monthly walk was to South Wraxall Manor House, on 7th of February. Train was taken to Bradford, thence up

the Devizes road to Kingsdown and South Wraxall. The manor house, built in the 16th century by Robert Long, has an elaborate chimney piece, enriched with caryatides and figures of justice, prudence, arithmetic and geometry, with date of 1596 on it. The manor was granted by Agnes, Abbess of Shaftesbury, with the consent of her nuns, to the monks of Farley, in 1252.

During the ordinary week-day walks Wellow and Stoney Littleton were visited on March 1st, *viâ* Odd Down, Burnt House, and Combe Hay. The "head" at the Oolite quarry near Bloomfield Crescent was noted *en passant*. Arrived at Stoney Littleton, after some little delay caused in procuring the key, which is kept at a cottage below, the heart-shaped chambered tumulus was entered, and the party were grieved to see that the roof of the furthest loculus on the right hand had fallen in, though the outside supporting wall of the tumulus had been recently repaired. The return to Bath was by Twinhoe and South Stoke. Clay Hill was seen in the distance covered with snow. The day was bright and clear, the wind cold and the walking heavy.

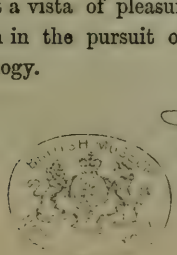
Bathford and Box, on October 18th, the object being to see the curious infilling of flints on the great Oolite quarry on the brow of the hill over Bathford. The beds having been worked back on the south side a much larger mass of flints had been exposed since the Club last visited it. Turning off the road to the left through Mr. Sainsbury's property, the new tramway for stone was followed to the main road, through Ashley Wood, and thence to the cross-roads on Kingsdown, over the golf ground to Box. Several large elms were seen prostrate, testifying to the severity of the late gale on the 14th.

Kelston on November 29th, a day remarkable for its fineness and the warmth of the sun. Bathampton on December 20th. The landslip at Combe Hay on December 27th; the usual causes of the many local slips seen around our hills were at work here—water percolating over the slippery clays of the Fuller's earth, and bringing the superincumbent beds down the slope.

A meeting of the delegates from scientific societies publishing Transactions having been convened under the auspices of the British Association for the purpose of discussing matters affecting the general management and interest of such societies, your Club was represented at the last meeting of the Association at York by your Secretary. An interesting discussion took place as to the best methods of stimulating local societies to more systematic and active work, and several suggestions were made. These will donbtlessly be embodied and issued in a formal report in due course. Fresh Members continue to be added to the Club, and the finances are in a sound state. The total Receipts of the year being £67 13s., and the total Expenditure £34 6s. 1d., leaving a Balance of £33 6s. 1d.

It now only remains for me to record the loss that we have sustained by the decease of two of our members, both eminent in their respective lines. Through the death of Dr. Falconer we have lost a good antiquary, one well versed in everything connected with the early and recent history of Bath. Through that of Mr. Charles Moore we miss from our midst the familiar face of one whose life was devoted to his favourite study, who has probably done more than any man since the time of William Smith to work out the geology of our own more immediate neighbourhood, whose reputation has passed far beyond the boundaries of our city and has indeed become European, who up to the last few days preceding his death was working with an enthusiasm peculiarly his own, and may truly be said to have died in harness. Who is there to supply his place? Would that the young men of the present day could see what a vista of pleasurable scientific research opens out before them in the pursuit of that most attractive of all sciences—Geology.

H. H. WINWOOD,
Hon. Sec.



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PROCEEDINGS

OF THE

BATH NATURAL HISTORY

AND

ANTIQUARIAN FIELD CLUB.

VOL. V. NO. II.

1883.

PRICE HALF-A-CROWN.

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1883.

Bath Natural History and Antiquarian Field Club.

INSTITUTED FEB. 18TH, 1855.

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Supernumerary List.

RULES

OF THE

Bath Natural History & Antiquarian Field Club.

1883.

1.—The Club shall be called "THE BATH NATURAL HISTORY AND ANTIQUARIAN FIELD CLUB," and shall consist (for the present) of not more than One Hundred Members.

2.—The object of the Club shall be to make Excursions around Bath, with the view of investigating the Natural History, Geology, and Antiquities of the neighbourhood.

3.—The Founder of the Club, the Rev. LEONARD BLOMEFIELD, shall be considered the permanent *President;* and a *Vice-President, Chairman, Secretaries, and Treasurer* shall be chosen each year from among the Members at the Anniversary Meeting on the 18th February.

4.—Quarterly Meetings for the election of Members, and for other business, shall take place on the *First Tuesday* in April, July, October, and January.

5.—There shall be a Committee of Management, consisting of the officers and two other Members of the Club (the latter to be elected annually), whose business it shall be to consider and determine all matters connected with finance, and printing the Proceedings of the Club, or papers read at any of its meetings; or any business requiring consideration previous to the Quarterly Meetings.

6.—There shall be Four Excursions during the year, to be fixed at the Anniversary Meeting, *subject to alterations* at any previous Quarterly Meeting, if agreed to by all the Members present—six to form a quorum. A list of such Excursions, with the respective places of meeting, shall be suspended in the Vestibule of the Bath Literary and Scientific Institution. Such Members as feel disposed shall also meet every *Tuesday*, at the Institution, at 10 a.m.

7.—The hour of meeting shall not be changed, except for the convenience of taking particular trains, when it is arranged to go by rail to any place ; in which case the altered time shall be posted at the Institution not later than Twelve o'Clock on the Tuesday previous.

8.—In arranging the Excursions, due regard shall be paid to Natural History and Antiquities, so as to secure an equal share of attention to each subject ; with this view, when the same Excursion does not include them both, they shall, so far as practicable, be taken alternately.

9.—Special Meetings shall be appointed for the Reading of Papers or Exhibition of Specimens, notice being given to the Secretary at, or previous to, any one of the Quarterly Meetings, by Members having such communications to make to the Club.

10.—Persons wishing to join the Club may be proposed by any Member at one of the Quarterly or Special Meetings, and elected (by ballot) at the next meeting afterwards ; three black balls to exclude. The Committee shall have the privilege of electing Four New Members during the year, provided there are vacancies.

11.—Any Members of the Club may invite a friend to accompany them on the proposed Excursions.

12.—It shall be the business of the Secretary to take Notes of the Day's Excursion, and to draw up a Summary of the Year's Proceedings, previously to the next Anniversary ; he shall also see that the proper Notices of Excursions are suspended at the Institution, and communicate with the Members by letter, when occasion shall require. The Treasurer's accounts to be passed at the Anniversary.

13.—A Subscription of Ten Shillings shall be paid yearly by each Member, with an Entrance Fee of Five Shillings, to defray any expenses the Club may incur otherwise than by journeys and refreshments. This Subscription to be considered due on the Anniversary. Newly elected Members to pay such a Subscription for the current year at the time of their election.

14.—Members whose Subscriptions are in arrear for one year shall be considered as having withdrawn from the Club, if, after application, the same be not paid up.

15.—There shall be a Supernumerary List for Members whose absence from Bath does not exceed three years. Such Members, on their return, and on payment of their Subscription for the then current year, may be admitted to the Club at once, or so soon as a vacancy occurs.

H. H. WINWOOD,

Hon. Sec.

NATURAL HISTORY

BOUNDARIES OF THE MANOR OF BATHFORD.

Henry Spackman, Surveyor, Bath, 1882

A Walk Round the Manor of Forde. *By* H. D. SKRINE.

(Read March 14th, 1882.)

This is a walk I have long desired to take in company with the members of the Field Club, but I have thought it best in the first place to give them some little explanation of the route and a few particulars respecting the history of the Manor and the names of the boundary fields.

The Manor of Forde includes Warleigh, and probably in the remote ages of the Saxon Conquest Shockerwick also, but we cannot show that for many centuries any connection existed beyond the parochial relation, as Shockerwick was a separate Lordship at the time of the Conquest. The first authentic account of the Manor is in a deed of the 10th century, where it is stated that in the reign of King Eadwig, A.D. 957, that King granted on the petition of Wulfgar, the Abbot to the Monastery of Bath, "Decem mansas in loco ubi antiquorum relatu nominatur Æt Forda,"* *i.e.*, Ten Farms in the place which by the tradition of the Elders is called "At the Ford." These ten farms included the whole of the central portion of Bathford parish. Warleigh was however afterwards added to the Abbey demesne and included in the Manor by John de Villula, Bishop of Bath and Wells.

The name was given to the Manor on account of the two roads by which it was approached from Bath and Bathampton, both passing over fords—one over the Box brook or Weaver, the other over the Avon. The latter has been entirely disused for nearly a century, and the ford over the brook, though still used occasionally, is rendered unnecessary by a good county bridge, which existed nearly 300 years ago, as it is mentioned in a survey of 1605.†

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* Dugdale Monasticon Anglicanus, Vol. ii., pp. 256, 262. Warner's Hist. Bath, App. v., p. 4.

† This bridge was either repaired or re-erected in 1665, as appears from an inscription which is here given and for which and a photograph of the bridge I

The ford over the Weaver was probably the best known to travellers, as it was on the high road from Bath to Marlborough and London. The other over the Avon was well known in pre-Roman times as it was on the direct British road from Devonshire to Lincoln, which crossed over Hampton Down.

The Manor remained in the possession of the Monks of Bath until the dissolution of the monasteries, when after passing through several hands by lease from the Crown it was eventually purchased by trustees on behalf of three copyholders of the Manor, two of whom were ancestors of my family.

There are two authentic documents which give the boundaries of the Manor. One of these is taken from a Saxon charter of the 10th century, given by Kemble in the third volume of the Codex Diplomaticus. The other is a Survey, in my possession, taken by Sir Edward Hungerford and four other Commissioners in the third year of King James I. by Royal command (A.D. 1605). The words of the first are thus translated from the Saxon by my friend, Mr. Jones, vicar of Bradford-on-Avon :— "These are the land-bounds of Ford : First, from the Avon along the Street (strata or Roman way) to the One Stone ; from the One Stone to Beonan-legh (Bannerdown) ; thence to the Weaver, along the Weaver to Sibyrth-legh ; thence to Hnœs-

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am indebted to my friend Captain Sainsbury. These are the names (*i.e.*, of those who certified to the bridge being sound) :—

SIR THOMAS BRIDGES, KNIGHT ; SIR WM. BASSETT, KNIGHT;
ALEXANDER POPHAM, ESQ. ; JOHN HARINGTON, ESQ. ;
PETER ROYNAN, ESQ ; WARRICK BANFIELD, ESQ. ;
JUSTICES OF THE PEACE.
ANTHONY CAREW, ESQ. ; GEORGE CLARKE, GENT.
JOHN . . . . GENT., AND
TRESURERS AND SURVEYERS.
STEVEN BROAD AND GEORGE GRUMBOLD,
AND JOHN WOODWARD, JOHN PEARCE,
WM. JOANES, WORKMEN.

1665.

legh, thence to Cunuca-(Conk)-legh, from Cunuca-legh (Conkwell) out to the Avon."

The Survey states the bounds on the oaths of the jurors as follows :—" Commencing at a bridge called Ford bridge and thence towards the west as far as a place called Paradise for the space of a quarter of a mile, and thence towards the north as far as Briton's land under Bannerdown for half a mile, and thence as far as the house of Richard Price for half a mile, and thence towards the east as far as a chapel called S. Giles' Chapel, and thence as far as a ground called Matford's Mead by Shockerwick Lodge, part of the demesne lands of the Manor, for half a mile, and thence towards the south as far as Niveys Pye for a quarter of a mile, and thence to Kingsfall Brook, and towards the east as far as Ashley Wood for half a mile, and thence towards the south as far as Inwards Gate for the space of two miles, and thence towards the west as far as Southwood's End, and thence as far as Conkwell Lane for the space of one mile, and thence as far as the bank of the river at the West Meads, and thence as far as Ford Bridge aforesaid for the space of two miles and a half.

In Witness, &c."

Let us now start, as the Jurors did, from Ford Bridge with our heads towards Bath. Ford Bridge crosses the little brook known as the Box Brook, but really is the Weaver (Saxon, Wæfer), so called perhaps for its many windings through the vale. The bridge is close to the ford which gave its name to the Manor. The boundary of the Manor for its whole western extent is the river Avon, and we follow this in a north-westerly direction for a quarter of a mile says the Survey, " as far as Paradise Close," *i.e.*, to *Avondale House*, passing under the Great Western Railway arch and by the Quakers' burial ground. This field, which adjoins Avondale House, is Paradise Close, part of which must have been taken for the building and gardens. The name is singular, and although the field very appropriately contains a cemetery, has no relation to the place of happy departed spirits ;

but I conceive is best explained by its having been the spot where a court of compurgation by oaths used to be held. Aubrey has a passage not inconsistent with this idea in his account of Ramsbury Manor. "Near this place (Bishopston), as the Indigence informed me, was some time a Sanctuary called Paradise, whither whosoever fled he was free from all arrests." The name is also written Pardis, still more like *Par Dieu* or *Pardie*, the form of expression in taking an oath. It is therefore most probaby that here was the court or place in which the freeholders in early times met to take the oath of frank pledge and further internal regulations of the Manor. On the adjoining waste still stands the Manor pound.

The garden wall of Avondale House extends from the river to the high road, and is the northern boundary of the Manor. Opposite to its angle against the road is a lane leading up into the Bannerdown road, which in the Saxon Land Limits is called the street (or *Strata Via*), the old Roman paved way to Cirencester from Devonshire. This lane is now the boundary of the parish and Manor; we follow it for a quarter of a mile, and a very pleasant walk it is in sweet spring time and summer from the wilding growth of the hedges and wild flowers on the banks. At the point where the lane branches off into the Bannerdown road must have stood the old boundary stone, "Thorne Anne Stone." It would be at an acute angle, the apex of a triangle of roads, that on the south going to Shockerwick,* and another coming up from that side, meeting the street in Bannerdown road at the One Stone.†

* It is interesting here to take note of the name of Shockerwick—derived from Soc, Saxon, Soka—an old Law Latin word for a lordship enfranchised by this King, with the liberty of holding or keeping a court of his Soc-men or Socagers, *i.e.*, of his tenants whose tenure is hence called Socagium or Socage (see Bosworth's Anglo-Saxon Dictionary). Shockerwick then was a Manor within a Manor, with independent jurisdiction and naturally the Lord had his own Chapel for his Tenants.

† It may be of interest to note that hereabouts is found a name that is sug-

The Survey of 1605 does not mention, "*The One Stone*," but goes direct from the river to "*Briton's Land under Bannerdown*," and here is at one with the charter, from the stone to *Beonnan-lèhe* (at Bannerdown). Briton's land probably indicates a former copyhold tenant, as the name was still known in the parish many years ago. Charles Britten was parish clerk. The old name "*Beonnan legh*" for Bannerdown, is easily explained to have a Saxon origin, Beonna being the genitive plural of beo—a bee—and thus it would mean the Bee-meadow or pasture. In early times lands were frequently leased to farmers, as Bee-pastures, the rent being so many jars of honey per annum to the Lord. There could scarcely be a more suitable plan for bee-feeding than just under the thymy sheep pasture of Bannerdown facing south and south east, and there are still two fields here retaining similar names, written now *Baw*-combe or *Boo*-combe, which may well have been originally *Beo*-combe or *bee*-valley.

The Saxon document here does not give details of the bounds but goes direct to the Weaver. The Survey takes us a short way on the Bannerdown Road and then along the fences of two fields called "Bawcombe," and then into the Shockerwick Lane. We follow it, keeping our eyes on the eastern boundary of the adjoining fields, to the "house of Richard Price." No such name is in the list of tenants at the time of the Survey, but it may be a mis-spelling for *Richard Pierce*, who lived up that way and is named in the Survey. There are several cottages, but which was Richard Price's I have not made out. From Price's house we are to find *S. Giles Chapel*, but that no longer exists save in the name of the Chapel Farm belonging to Shockerwick.* We can only

gestive of a memorial stone, "Canning's Grave," and in the Churchwardens' book of the bounds taken in 1775 "Cannard's Grave" is named, at the head of *Morrics* Lane, which is the old name of the lane we came up by from *Avondale* House.

* Collinson in his History of Somerset speaks of an old building the remains of which the inhabitants imagine to have been part of a Parish Church, which was built by one of the Husseys who owned Shockerwick.

follow the bounds now by the fields and may perhaps have to trespass a little. We pass through Summerleaze, Mow Down, Little Mow Down to Upper Matford which adjoins *Shockerwick Lodge.**

There the boundary line crosses the Box road to the Weaver brook which is here for a short distance the parish boundary (but hardly a quarter of a mile as stated in the Survey) till it comes to Long Ivies, which must be identical with "Niveys Pye" in the Survey. Pye appears to mean a divided meadow, and Long Ivies is probably the nearest approach to the old name "*And-Lang-Ufer*" along the river bank, which exactly describes the field.†

Here we cross the Weaver and the Railway and ascend the hill to Ashley Wood. (There is a footpath across the line near here, where a woman was killed some years ago.) "To *Ashley Wood*" says the Survey, "to *Hnœs-legh*" says the Charter. *Hnœs* ‡ means a *wet* or *boggy* spot, and here in this wood is the bog out of which the Kingsfall brook, which is here the boundary of the Manor and County, descends towards the Weaver. The brook though named in the Survey is not named in the Saxon Land Limits. From Niveys Pye to Kingsfall brook, and thence towards the east as far as Ashley Wood for half a mile. The wood being partly in Box parish and partly in Bathford, is divided by the Kingsfall brook or stream, and probably some old pollards mark (as usual in such cases) the line to the top of the down. There is a field at the top of the wood (grubbed out of the down or wood at some time) called Soapleaze.§ *Kingsfall* seems to indicate that the name of King's Down extended to this part of the hill, and now we are on the top of the hill and the line of boundary is the wall of Monkton Farleigh Down and Manor as far as No Man's Land near Conkwell.

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* The map here explains the line of boundary.

† N B —There is a field of this name in Warleigh similarly situated along the banks of the Avon. ‡ Hnœse-*Nesh* soft.

§ Named in the Survey as *Sopers*, a close of pasture and *Wood*.

We are on the extreme north-eastern verge of the County of Somerset and have a very fine and extensive view—including Monmouthshire—to the west, and Dorsetshire and even the Hampshire hills to the south, and the Marlborough Downs to the east and south-east The Tower on the edge of the Down, built by the late Mr. Wade Browne, replaced a semaphore which had been erected by the Government Surveyors in the time of the Welsh riots.

The sheep down along the top of the Bathford Hill is an ancient ridgeway—which communicated with the adjacent Manors in Wilts and Gloucester for a considerable distance—no bounds except perhaps Boundary stones formerly marking the division of the parishes. On these *links* (as they are called elsewhere) the country people used to play a game called, "*Stow*," or "*Stole ball*," now known to the aristocracy as the noble game of Golfe. I remember observing some holes like large marble holes on the down a great many years ago, and being told by an old inhabitant that they were used in a game played in these parts, and as he believed not in many other places in England.

While on this commanding height it may be interesting to try and picture to ourselves what was the condition of the country, not very long before the Charter from which we have quoted was drawn up.

At the time of the Saxon invasion, and even long after the time of Alfred, this whole country was a vast Forest, the Downs probably occupied as sheep pastures, and here and there as natural fortresses, but the sides of the hills and the valleys to a great extent covered with wood. Dr. Guest places the crest of Bathford Hill, which rises so steeply and grandly above the valley, as the Headland which on this side of England, after the Battle of Dyrham, was the frontier of the British Kingdom of Damnonia, extending over Somerset and part of Hampshire, to Devon and Cornwall. There are some indications here of encampments, and the Wansdyke undoubtedly culminated in and crossed the Farleigh Down a short distance beyond Wade Browne's Tower. The

opposite hill, Hampton Down, was a well known encampment, and through it the Fosse road originally passed. These heights were connected by the Vallum of the Wansdyke, and as I believe were connected also by a ford across the Avon. Here then we stand on the northern Headland, or angle, as it were of the British Kingdom which still existed for many years after the conquest of Bath independent of the Saxons, and the Forest formed a protection belt all along the eastern frontier as far as the New Forest. The Saxons do not appear to have occupied Bath after the battle of Dyrham, but allowed it to remain a desolate ruin and wilderness for at least a hundred years, but their earthworks in Dr. Guest's opinion may be traced on the opposite hill by Ditteridge, or *Ditch Ridge*; the valley of the Weaver being a sort of neutral ground.

Dr. Guest will not allow us to claim the still higher historical antiquity of the Kings Down as being the scene of the discomfiture of the Saxons after the battle of Mount Badon, but the situation agrees with the Romance, the fortified post of Hampton Camp, the ford and meadows between, and then the Kings Down. But this conjecture must remain among the mists that envelope the crests of the ancient hills here as elsewhere in England.

Under the ridge, where stands Wade Browne's Tower, all the way from Ashley Wood have been stone quarries, which were worked out shortly before the time of the inclosure of the common. The stone, though in a narrow thin bed, was of excellent quality, as may be seen in Warleigh House which was built of this stone in 1811. The whole of this ridge of down is included in the recreation ground set out under the Inclosure Act, and affords the most charming and extensive views. About a mile from Ashley Wood we reach the Bradford road near the Dry Arch, as it is called. Just at the point of junction between the common and the road the Bathford Revels were held till about 50 years ago, when, owing to the free fights that took place, the Magistrates stopped the Revels. They were held a week before Palm Sunday, and

were called "*Cankery Hole*" Revels, and dogs and cats used to be put into the clefts in the rocks above, where it was supposed was a subterranean passage to Farleigh, and it is, I believe, true that foxes have run through to the Farleigh side.

Just below this part of the Down in the Warleigh House wood are the ruins of the old Warleigh Keeper's Lodge, whose widow, Sally Gibson, was in my childhood accounted a witch, and died at a fabulous age. Her smoke-dried hut was like an awful cave of Trophonius to us children, and her thin shrill sepulchral voice still rings in my ears. At her death the carpenter who acted as sub-bailiff burnt the cottage down and declared to us children that he saw something on a broomstick go out of the chimney! A flat spot of ground close to the cottage was turned into a rustic fort by my father to commemorate the skirmish of Claverton, believing that the cannons which were then fired at Claverton House were planted on or near the spot, and it seems likely enough. We now come to the Dry Arch, and crossing it turn over a stone stile to the right hand and follow along the down to Inwood Gate, ("Inwards Gate" in Survey). This must mean "End of the woods." There is a stone wall at this gate which extends as far as Conkwell, and is the boundary of my property and of the Manor. But we shall do well to follow through *Inwood*, as the Farleigh Wood is still called, to Southwood's End, that is to the end of Warley Wood. We now reach a small patch of waste called "*No Man's Land*, on which another gate opened from one side of the Manor, which I had walled up some years ago. "*No Man's Land*" is another instance of the inter-commoning of different parishes, as there was a continuation of the waste past the hamlet of Conkwell, as far as the high road to Winsley and Bradford from Limpley Stoke and Bath.

From Ashley Wood we have come to Conkwell, Cunuca-legh in the charter. There have been several suggestions to account for the origin of the name. Cunuca is in the opinion of a more learned archeologist than myself derived from the Latin *Cuniculus*,

or rabbit, or rabbit burrow, and indicates the existence of a warren here in olden times. Conkwell is then like Conygre—*Cuniculi-ager*. A corruption of the Latin name *Cunyng*, is an archaic English name for Rabbit; and a more likely place for rabbits cannot be found than the woods and fields adjoining, and they have their impregnable fortress in the hollow rocks on all sides.* Whether the well or spring that supplies the village accounts for the latter part of the word Conk *well* may be doubted. It may be a corruption of *Hylle*-Hill, in the charter it is *leaze* or *field*. The bounds go down Conkwell Lane to the southern end of the wood, called now Warleigh Wood and through two fields to the Avon. The uppermost of these fields is called Gatticks and Garricks. The former is a corruption of *Gate-Wake*,† so spelt in the Survey; the keeper of the gates or way of the Manor would doubtless have a cottage here, and there would be a gate into the Conkwell Lane out of this the last field on the Manor. The next field is the Westmead, or the western meadow of the Manor, and here we have the Avon for a boundary mid-stream back again as far as Paradise Close.

But there are some names of fields along the course of the river that are interesting and suggestive, and it is a very pleasant walk by which to return to Bath. You first come to the Great and Little Oxmead, which may mean the Water Meadows, from *oc*, or *ocche*, a British word for water-stream, as they are very wet still unless the drains coming out of the wood are kept clear into the ditches, and there are several longitudinal mounds, which may have served the purpose of damming up the water from springs for irrigation. The meaning which however was most in our minds formerly was that the meadows in question were used for fattening oxen. In the Great Oxmead are

* It may interest Geologists to know that this rock-fortress of the rabbits can be traced in "conic" sections in an old quarry under the field called Biggs Lease adjoining Conkwell.

† *Geat*, Sax., a gate, an opening, a gap; *Wic*, village, or station.

the Rifle Butts of the Warleigh Manor Company of Rifles. The next field to Little Oxmead is called "The Batch." The word means a small stream or rivulet, and such a stream still exists. The next is *Binney*, by the eye, or islet, opposite an island in the river joined by a mill hatch in former times to Warleigh Mill. This mill is mentioned in the Survey of 1805, and also in a record of the perambulation of the parish in 1775.* My father purchased the mill and ferry about 60 years ago, with the fishery half-stream the whole length of the Avon so far as the parish bounds extend, and of the whole stream of the Box Brook up to Shockerwick Lodge, was conveyed to him at the sale. Just outside the mill house is the ancient ford road, a pack-horse road of very great antiquity, branching off from the main Fosse road from Seaton to Lincoln at the top of Claverton Hill, and on the Farleigh side joining eventually the old Marlborough road. The Dry Arch crosses this road at the top of Warleigh Hill. If we cross the ferry we land in the Ham Meadow of Claverton, where an important skirmish took place between Waller's forces and the Royal troops a few days before the battle of Lansdown. I was always of opinion that the troopers of the Parliament crossed over by the ford, but it appears from an able paper read to this Club some years ago by Mr. E. Green that Waller had thrown a bridge across the Avon. He had planted his cannon, as before observed, on a high terrace in Warleigh Wood, com-

* The bounds here were defined to include the mill premises and small island adjoining the Weares.

In a lease dated 1660 from William Skrine, of Bathford, to James Biggs, Warley *Wares (sic)* are thus described :—1st, Warley Mill, rood of meadow ground lying near the same mill, and the *Weares*, floodgates, and flood hatches thereto belonging. 2nd, by the willow-beds growing on the north side of the said Weares, near the said Weares, with the fishing the said Weares, and of the half stream of the river from the south side of the said Weare unto the south end of a close of meadow called Mill Mead.

It is important in my view to notice the word Weare mentioned so often in connection with the ancient fishery which I believe gave its name to Warley—the Weare-Lea.

manding Claverton House, and under cover of these had crossed swords in the Ham Meadow. The defeated cavalry fled along the Warleigh Meadows, a route which we are about to take to complete our tour. The first meadow is called the Tyning, which has been thought to mean the ten acres, but which I derive from "Tynan," Anglo-Saxon for to *hedge in a fence*, and conclude it was the meadow fenced in close to the Villan's house who farmed Warleigh for the Prior. The old Manor House of Warleigh stood at the top of this field, and in the adjoining shrubbery, or Grotto Walk, as we call it, which was laid out by "Capability Brown," is a remarkably fine old yew tree, about 25 feet in girth, and quite stagheaded. It may have seen the Conquest, and doubtless stood near the principal house on this part of the Manor. Warleigh having been held by a thane in olden times, and after John de Villula bought it, seems to have been always held separately by the Prior down to the dissolution of the Monastery.

Next to Tyning a narrow strip of meadow now thrown into a kitchen garden led into the field called Clotmead—or the Meadow of the Clot, or *yellow water lily*, which corroborates the view taken by Professor Earle of the origin of the name of Claverton—as *Clot-ford-ton*, the village near the ford of the Water Lily, and certainly there are lots of clots, or water lilies, still in this part of the river. There is a very picturesque view from the Clotmead of the Hampton Rocks, with a fine curve of the Avon, overhung by abele and willow trees in the foreground. Here have been frequently held battalion drills and sham fights of the Warleigh corps of the Volunteer Rifles. We now pass under the terraces of the Manor House of Warleigh and through a field called Bean Leaze (showing former arable cultivation) to Summer Leaze, the lower part of which was once fenced off parallel to the river, and called *Long Ivies*, a similar name to Niveys on the Box Brook. The next field is Wash Pool, or Welshpool; I believe the deep ditch which divides it from Summerlays, now a sunk

fence and walled, was the place where they dipped the sheep—a strong spring runs into the river here. We now come to a field which has in my opinion a real connection with ancient history—*Momford's* mead, or Mumpas meads it is called in different deeds; here under a slightly elevated terrace marked at one end by a pollard tree was found a capital of a Roman pillar of very handsome workmanship, which is now in the vestibule of the Bath Royal Literary Institution; it plainly belonged either to a temple or to the residence of a Roman of distinction, and close by was found, in my time, a coffin which the labourers broke up thinking it to be an old drinking trough. The northern fence of this field is in a line with the Wansdyke, which here was the boundary of Warleigh against Bathford, and higher up above the Bradford road is an ancient tumulus now planted with trees. A very large and moss-grown stone in the ditch marks the ancient boundary, and a strong stream fills the ditch all the way to the river. But it is not merely because a Roman villa or a temple once stood here, but on account of the name of the field itself that we may attach some history to the spot. The name probably means the Ford, or passage to the Mount, *i.e.*, Hampton Camp. This is clearly referred to in the land limits of Hampton, which from the river just opposite to this field follow upwards the course of a streamlet or brook, called the Mere-broc (Boundary brook) to the Herces-dike or dyke of the Camp; the Wansdyke being a national or tribal boundary had its fortified posts on its line, and this Camp was one. The Belgæ no doubt took care to draw the line of defence across a river at a place where there was a ford, and although I have not yet tested the matter, I feel strongly disposed to think we should find a ford here.

We pass several meadows, all formerly more or less water meadows and carefully under-drained, till we come to the last field on the Warleigh estate, which is called Horselands. Just inside the southern fence was the ancient ford road supposed to have formed part of the old British road to Lincoln. Its course, however, was

diverted perhaps as soon as Bath became a place of importance, and it was chiefly used since the Roman occupation of Bath as the road to Marlborough. We can trace it up past the Lower House Farm and the Bathford schools—after passing which it is called *Court Lane*—from its vicinity to the Monks' Barn or Court Baron (now the schools), where the Manor Courts were held. Court Lane ends in Warleigh Lane now, and on the other side the right of way is preserved in a stile and ancient footway leading into the old Marlborough road up the hill, and to a private road to the quarries, long disused. I have spoken of "the Lower House" Farm; the name seems to have been given the farm from a discovery which attracted much attention in the 17th century. Aubrey thus describes the remains of a Roman villa found in Horselands, A.D. 1655. "At Bathford (near ye Citie of Bathe) was found by digging of a drayning trench deeper than ordinarily in the grounds of one Mr. Skreene in the year 1655, a roome *underground*, which was about fourteen foot one way and 17 feet the other, the pavement of which was opus tesselatum (tesselated work) of small stones of several colours, viz., white (hard chalk), blue liasse and red, fine brick." I had several of them which I gave to the Repository of the Royal Society. "In the middle of the floor was a blue bird, not well proportioned, and in each of the 4 angles a sort of knott. This ground and the whole manor did belong to ye Abbey of Bath. Underneath this floor there is water. The floor is borne on pillars of stone about an ell distant ye one from the other. On the pillars were laid plank stones on which the opus tesselatum was layd. The water issued out of ye earth a little below, and many persuade themselves there is much water in it. This discovered place was so much frequented that it caused Mr. Skreene to cover it up again, because ye great concourse of people, especially from Bathe, injured his grounds, but he would not cover it so soon, but ye people had torn up almost all ye work before I came hither to see it, but his daughter in lawe hath described ye whole floor with her needle. Mr. S. told me there is another floor adjoining yet untouched."

I have made a conjecture that here was the residence of some high Roman official, perhaps the Prætor, and that the meadow may have been used for the exercise of the cavalry, as in those days there was a long extent of unfenced meadows. At the north end of this meadow the Weaver falls into the Avon, and our walk round the Manor comes to an end in the high road to Bath close to Ford Bridge.

Extracts are here appended from Bathford parish books, showing most recent surveys of the parish, which is more extensive apparently than the Manor.

At a *Monthly* Vestry Meeting held on 16th May, 1775, J. Chapman, Vicar, Richd. Dickson Skrine, James Yeeles, Wm. Briscoe, Geo. Booth Tyndale being present, it was resolved that the Parishioners do go round the bounds of the parish, according to ancient custom, on Holy Thursday, and the expence attending thereon be paid out of the Poor rate.

Whereas in persuance to the above order of Vestry, a procession was made the twenty-fifth day of May, 1775, by us whose names are hereunder written, and the following remarks were made at such places as are hereafter mentioned :—

First, at *Warley Wares (sic) as on the other side.**

Second, that all the bounds from the River Avon at the south end of Bathford parish, to the first gate leading into the wood at No Man's Land, where there is a wall, from that gate to the gate leading into

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* In a lease dated 1660, from William Skrine to James Biggs, Warley Wares *(sic)*, are thus described—First, Warley Mill. Rood of meadow ground lying near the same mill, and the *Weares (sic)*, *Flodgates (sic)* and Flood hatches thereto belonging. 2dly, the Willow beds growing on the north side of the said *Weares* near the said *Weares*, with the fishing the said *Weares* and of the half stream of the river from the south side of the said Weare unto the south end of a close of meadow called Millmead.

GEO. BOOTH TYNDALL.
WM. BRISCOE.
WM. FISHER of Ashley.
JAMES YEELES.
ROBT. FISHER, of Bathampton.
ROBT. BRISCOE.

Warley Hill, which wall is in Wiltshire, and all the bounds from that gate to the top of Shockerwick Sheep Sleight belong to Wiltshire (except about 2 lug in Kingsall's hedge near the stile going in to Mr. Northey's Kingsall's), and from the further side of Shockerwick Sheep [Sleight]* to the top of Hinniards, belong to Bathford parish, and from that place to Hinniard's hedge at ye lower end of the wall to that ground belongs to Bathford, and from that place to Gays leaze wall belongs to that parish, and from Cannard's grave to the bottom of Morries Lane belongs to that parish, and opposite that lane round Mr Flitcroft's house to the River Avon to Box brook mouth belongs to Bathford parish, and the river bounds it to the top of Oxmead at the south end of Bathford parish.

That stones be placed in the Chippenham road *were (sic)* Box brook run which divided the P of Bathford from Box near Matford Meadow, and at the top of Bannerdown, across the road, opposite where the wall formerly stood, that belonged to Diewett's Sheep S . . . t ., and at the top of Hinniard to the hedge at the bottom of Hinniard wall.

The bounds were ordered to be perambulated on 1st October, 1821, but no account is given of the event, but an item appears in the Churchwardens' accounts, April 8, 1822, of £3 4s. for expenses incurred.

On the Sources of the River Thames, and the Deification of Ancient Rivers, with some account of discoveries made at their Sources. *By* Rev. PREBENDARY SCARTH, M.A.

(*Read May 23rd*, 1882.)

The river Thames rises not many miles from Cirencester, close by the line of the ancient Roman road called the Foss Way, but the Seven Springs near Cheltenham are also claimed as the source of that river.

In the parish of Kemble there is a marshy tract north of the Foss; this ground has a large number of springs, and their

* The word "sleight" left out in original.

confluence is in a field called Trewsbury mead. This also is claimed as the source of the Thames. There is a large encampment above on the higher ground.

Rudder, in his History of Gloucestershire, says that the Thames has been reputed to rise in the parish of Coats out of a well, which overflows in the winter, or in wet seasons, but in the summer it can be traced no higher than to some springs which rise in the parish of Kemble, south of the Foss road.

The Thames and Severn Canal formed some considerable time ago has probably affected the springs in the neighbourhood. The water is pumped into the canal after being collected from the springs. There are traces of an old water-course on the north side of the Foss road, and an old culvert passes under it. This is now dry except in winter, but formerly conveyed water from near Trewsbury Camp. The following is the account given in a recent publication on the name "Thames." "At a spot on the right near the Tetbury Road Station, called 'Thames head,' from the earliest times, that celebrated river is considered to have its earliest flow, though a similar honour is claimed for 'Seven Springs' in the parish of Cubberley; seven springs arise here, but there is one stream pure as crystal and tasteless, which runs into a small tank; this would be the Thames, but owing to a powerful pump, which works night and day, this water is discharged into the canal at the rate of 250 gallons per stroke."*

"Isis," says Leland, "riseth a iii myles from Cirencester, not far from a village cawlled Kemble, within half-a-mile of the Fosse Way between Cirencester and Bath."

Camden says, "Leaving Corinium (Cirencester), the river Corin, ten miles off, unites itself with the Isis. This river, commonly called the Ouse, to make it derive its origin in Gloucestershire, rises from a continual spring in the south edge of this county, near the little village of Torleton, not far from

* See Hand Book for Gloucester, Hereford and Worcester p. 16.

the famous Foss Way. This is the *Isis*, which afterwards receiving the Thames takes the compounded name of *Thamesis*, chief King of British rivers, of which one may justly say that it both sows and waters Britain, as the ancients said of the Euphrates in the East."

Rudder says, "This river has generally been considered to be the head of the Thames, which, according to current opinion, had that name from the two rivers *Thame* and *Isis*, as their waters join near Dorchester in Oxfordshire."

This derivation is not confirmed by old charters, which mention the river always as "*Temes*" before it comes near *Thame*. There is a charter granted to Abbot Aldhelm, in which it is written *Temes*, and in other charters granted to Malmesbury Abbey, as well as to Evesham, and in old deeds relating to Cricklade, and it never occurs under the name *Isis*. The common people knew it by no other name than *Thames*, and the Saxons wrote it *Temerze*, from whence we call call it *Thames*.

All the historians who mention the incursions of Æthelwolf into Wilts (A.D. 905) or in Canute (A.D. 1016), say that they passed the *Thames* at Cricklade.

The name is probably British, we have *Tame* in Staffordshire and Lancashire, *Teme* in Herefordshire, *Tamar* in Cornwall. In Wales many rivers have the name *Taff*, *Táf*. Cæsar always speaks of the river *Thames*, as "*Tamesis*."

Names of some rivers beginning with a T are here given:—*Thames*, *Tibur*, *Tigris*, *Tagus*, *Tay*, *Tyne*, *Tamar*, *Tavy*, *Torridge*, *Teme*, *Tees*, *Tame*. It has been suggested that the Greek word ποταμος, Potamus, a river, is the origin of these, the syllable πο, being simply a prefix, "*The* River;" in which case ταμος would become *Thame*, or *Tame*.

The question is, has the Greek word "ποταμος" a root common to other languages, and can it be shown that this word signifies a river or water? If so this would account for the same word occurring under a variety of pronunciations. The name "Yeo"

is applied to many rivers in Somerset, and this appears to be only a corruption of the word *Eau* water.

There is no record of coins or votive offerings having been found near the sources of the *Thames.*

This is singular, as such have been found at the sources of other rivers, as we know from what have been collected at the source of the river *Seine,* and are now in the Museum at Dijon.

The worship of springs is of ancient date, and we have proofs of it in this island, as at Bath, where an altar was found near the source of one of the hot springs dedicated to the presiding goddess, and coins, which had been placed there as votive offerings.

There were found in June, 1875, coins and remains of offerings at the source of a small stream at Horton in Dorsetshire.*

The "Sacred Fount," "Fons Sacer," was an object of reverence in times of heathen superstition. The rites peculiar to the worship of springs were called "Fontinalia." We have a beautiful ode of Horace† in which he alludes to the offering of a kid, made to the Divinity of the spring. I myself found lately the head of a young goat, at the foot of a basin which received the waters of a pure spring, and which was being repaired, and a drain constructed from the spring. It was found in making the drain.

Fountains are celebrated in Mythological History; allusion is made to them not only by Horace, but by Ovid, Virgil, Martial, Juvenal, Tacitus, Livy, Plutarch and Seneca. The latter says, "Magnorum fluvium capita veneramur."

If any one will visit the Museum of Antiquities at Dijon they will find there numerous objects, as well as some altars, discovered at the source of the Seine, which rises near Besançon. Around the principal spring were found the foundations of a Roman Temple, and within it many "ex voto" offerings, carved in stone, also a vase containing votive offerings in bronze and

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* See Journal of Archæol. Asso., 1876, p. 60.

† Carmina iii. 13.

silver, and eight hundred and thirty coins from Augustus to Magnus Maximus. The vase was inscribed DEAE SEQVANAE RVFVS DONAVIT.

It is only lately that in clearing out a well near one of the stations on the line of the Roman wall in Northumberland (Procolitia), a vast number of coins of different dates, and all Roman, together with other dedications to the Goddess *Coventina*, were discovered, and figures of the Nymphs were also found. The well on examination proved to be in the centre of a Temple.* At Chester a large altar, inscribed on two sides NYMPHIS ET FONTIBVS, was found not far from a spring which is supposed to have supplied the city with water in Roman times.

It might have been supposed that considering the importance of the river Thames, some such memorials of river worship as we have mentioned would have been found at its source, or if destroyed, some would have been recorded. But none such are mentioned by Camden or by any local topographer.

When the Archæological Association visited the Seven Springs in 1869,† and examined the spot, all that could be discovered was a *single stone* of very ancient date, and this marks the point known as the "Thames Head," where the Seven Springs take their rise, but these are now nearly drained by the pumping engine already mentioned, which conveys the water into the Severn and Thames Canal. The basin formed by the hills around, where the springs rise, is therefore now dry, though formerly a morass.

It is difficult to believe that so noble and so important a river as the Thames should not have been honoured at its source equally with the Seine, and less important rivers, but the same

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* See Proceedings of Newcastle Society of Antiquaries, paper by J. Clayton, Esq.

† For an account of the visit of the Archæological Association see Journal Vol. xxv., p. 283, 1869; also a Paper on the Source of the Thames and its Nomenclature, by G. T. Wright, F.S.A.

fate has awaited "Father Tiber;" at the spot where that river takes its rise in the Appenine Hills, at a point where they approach nearest to the Adriatic Sea, in Mount Fumajolo, situated nearly mid-way between Florence and Urbino, no memorials, as far as I can ascertain, have been discovered, and I have made inquiry in vain for any such; but at the end of this paper is given the inscription on a votive altar preserved at Rome, but not found at the source. The source of the Tiber is in a thick Beech Forest, and the little stream tumbles from a ledge of splintered limestone rock, and soon splits into many different rills.

One who has visited the spot thus records his feelings.*

"My mind was filled with emotion, it was like being present at the birth of one who should alter and control the destinies of the world. The whole history and associations of the stream arose within me with a crushing sensation of overpowering vastness, from the first settlement founded on its banks, through the grandeur of the lordly Rome of Augustus, to the modern ecclesiastical city. I thought of the many lives that had been lived out on its banks, and the many battles that had been fought there. I thought of the lands it passed through, the low-lying marshes of Ostia, the solemn undulating Campagna, the sunny mountains and valleys of Umbria, the spreading fields of corn, vine, and olive, the towering cities, the quiet homesteads, the rocky nooks and fastnesses in its course, and the mighty influence the denizens of its shores had had on the history of mankind and its civilization: all these were brought before me." And surely some such feelings must awaken in the minds of Englishmen in contemplating the sources of the Thames, a river which probably has, and is still exercising, if not as great, yet perhaps a more beneficent and beneficial influence upon mankind, not extending over one world alone like the Roman, but penetrating into lands unknown to the Romans.

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* The Pilgrimage of the Tiber, by William Davies.

The *Thames* rising in Gloucestershire, separates Oxfordshire and Buckinghamshire from Berkshire, Middlesex from Surrey, and Essex from Kent. It dips into Wilts near the northern boundary of that county at Cricklade, and the chief towns on it are:—London, Gravesend, Woolwich, Greenwich, Deptford, Richmond, Kingston, Staines, Eton, Maidenhead, Marlow, Henley, Reading, Wallingford, Abingdon, Oxford, Witney, Burford.

The following inscription is copied from a votive altar now in the garden wall of the villa Albani at Rome, at the head of the Ilex Walk (8th January, 1878).* It is stated to have been found in a garden plot near the Tiber.

SEX · ATVSIVS
SEX · FIL · FABIA
ROMA · PRISCVS
EVOC · AVG
PRIMVS · OMNI
VM · ARAM · TIBERIN
POSVIT · QVAM · GALI
CATVS · VOVERAT

"Sextus Atusius Priscus, the son of Sextus, of the Tribe Fabia, "of Rome, one of the Imperial body-guard, first of all placed an "altar to the river Tiber, which had been vowed by Gallicatus."

The Evocati, named in the Inscription, were either soldiers who had served their time, but were liable to be called to do military duty as Volunteers. "Voluntarii," or the name "Evocati," was given by Galba to young men of the Equestrian order, who formed his body-guard. The addition of the word Aug(usti) leads to the supposition that the dedicator belonged to the latter.

The Tiberis, or Tibris, was also called Tiburinus, the old name of the river being Albula.

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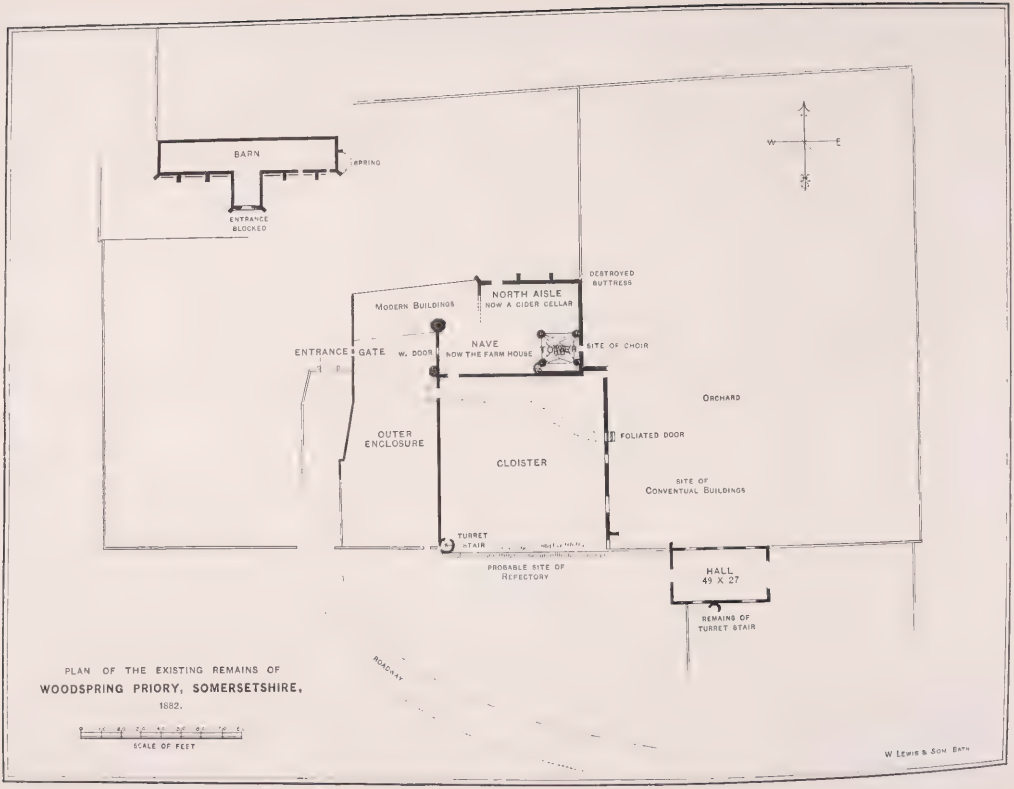
* See Corp. Ins. Lat., Vol. vi.



PLAN OF THE EXISTING REMAINS OF

WOODSPRING PRIORY, SOMERSETSHIRE,

1882.

SCALE OF FEET

W. Lewis & Son, Bath.

Woodspring Priory. Founded 1210. *Dissolved* 1534.

By R. W. PAUL.

(*Read* 10*th October*. 1882.)

Woodspring Priory is situated about five miles north of Weston-super-Mare, and under the southern slope of a short ridge of hill, which runs parallel to Worle Hill, terminating in a promontory known as Swallow Cliff.

It is unnecessary to repeat what little is known with regard to the history of the Priory, as this may be found on referring to Rutter or Collinson. The following notes are intended merely as a description of the buildings of the Priory as at present existing, and are described in the order in which they are generally visited.

Of the Church, which consisted of a nave and north aisle, central tower and choir, all remains excepting the choir, but the existing portions have been very much pulled about. Besides the Church are the walls of the cloister, a fifteenth century building known as the "Hall," on the south-east of the cloister, the outer enclosure with the entrance gate and the barn.

Close to the Priory gate (which is on the west side of the outer enclosure) are two shields originally, according to Rutter, in the north aisle. One bears the five wounds and the other a chevron between three bugles.

The *Priory Gate* itself consists of a small and large entrance, of plain character, and of the fourteenth century date.

Entering through this we are in the outer enclosure, the Church and cloister wall on the east side immediately in front, and a group of more modern buildings on the north side.

The *West Front* of the Church shows a gable, flanked by two octagonal turrets, with pierced parapets. The west window and door can still be made out, as also can three niches, one over the window and one on each side of it. The latter retain traces of figures, that on the north being apparently mitred, and generally supposed to be S. Thomas à Becket, to whom, together with the Virgin and the Trinity, the Priory was dedicated.

A modern porch and door near the southern turret leads to the cloister court. From here, standing on the south-side of the cloister, a good view of what remains of the Priory Church can be obtained.

The nave, which is of late fifteenth century date, may be said to be divided into three bays. The westernmost is blank, the dormitory having abutted on the Church at this point, as the remains of the gable still show. The door which led from the Church to the west cloister still remains in use. The remaining two bays are occupied by two large four-centred windows, now denuded of their tracery.

In the south-east view of the Priory given in "Rutter's Somerset," the window south of the tower is shown retaining perpendicular tracery dividing it into four lights.

Above these windows runs a pierced parapet of panelled quatrefoils. This parapet is also continued in front of the tower, and underneath is another four-centred window similar to the others, and also blocked. Between it and the easternmost window of the nave is a staircase (which does not however project) which finishes above the parapet in an octagonal turret with cap and finial.

The tower rises two stages above the parapet, and one stage above the gables of the nave and choir. The lowest stage has two-light windows on the north and south sides, while the upper stage has four very beautiful windows, one on each face, pierced in the centre, and blocked at the top and bottom. Above this is a pierced parapet of same pattern as that on the nave, with the remains of eight pinnacles. The tower has also diagonal buttresses.

The walls of the cloister remain on the east and west sides. At the south-west corner are the remains of a stair which led formerly to the dormitory. The east wall has three arches, two blocked and the third still open. This is a fine foliated door, and probably led to the chapter-house. Through this door

brings us to an orchard which covers the foundations of the choir, and the conventual buildings.

The east front of the Church shows the eastern tower arch, and the gable of the *north aisle.* This aisle is divided on its north side into three bays by buttresses, and retains traces of four-centred windows, and a doorway. The doorway is in the westernmost bay. On the east side the east window can be traced in the wall, and a portion of its hood-mould still remains. Underneath is a moulded plinth which runs southward until stopped by the once existing north wall of the choir. This shows that the choir was aisleless.

Near the south-west corner of the tower is a large piece of masonry. It consists of a portion of the jamb and sill of a window of the same pattern as those in the nave. This is generally supposed to be the remains of the south wall of the choir, but from its general appearance it is more probably old materials built up to support the tower.

The Interior of the Tower.—The tower is supported on four chamfered octagon piers with panelling and engaged shafts, and from these spring an elegant fan vault, the whole being carved in Caen stone. On the rebuilding of the tower in the fifteenth century a space was left north and south (the former tower having been oblong), and on the south this was used as a chapel, and the remains of the canopy work are still to be seen on the south-east pier of the tower. The west and north arches are blocked, the nave being used as a farmhouse and the north aisle as a cider cellar.

The stairs before mentioned at the south-west corner lead to the ringing chamber and also to the leads behind the parapet of the south chapel. Another staircase leads to the top of the tower within the south-west angle. From the top of the tower a very extensive view can be obtained.

Going southward across the orchard we come to the "Hall." This is a fine fifteenth century building 49 feet long and 27 feet

wide, with an oak roof in good preservation. It is lighted on the north by two 2-light windows, on the south by another, and on the west by a third, which is, however, shortened by a gable which cuts into its sill. The principal entrance was on the north side, where the door remains (but blocked) with a gable over it. On the west is a smaller door. The east wall has been destroyed to accommodate carts, pigs, &c. Against the south wall are the remains of a newel stair which led to some building now destroyed.

Inside, the north door is more plainly visible, and in the south wall near the west end is a door, some distance from the ground, which perhaps conducted to a gallery running across the western end of the "Hall." This door is covered by masonry on the outside.

At the north-west angle are the remains of a door with considerable traces of a projecting wall above it. With this door corresponds a similar door at the south end of the east cloister wall.

All this goes to show that not only was this so-called "Hall" an important building, but that the once existing buildings of the Priory must have been very extensive and probably covered the entire space now occupied by the orchard, and also the two fields south and west of the "Hall."

The Barn is to the north-west of the Priory Church, and is a large building of the fifteenth century, with a projecting entrance on the south side.

The Scale on the accompanying plan is only to be considered as *approximate*, the plan being more especially drawn so as to clearly show the relative positions of the remaining buildings.

On the Cure by Touch; with Notes on some Cases in Somerset.

By EMANUEL GREEN.

(Read January 10th, 1883.*)*

The general history of the cure of scrofula by the royal touch has been often noticed, but, as a local subject, from the rarity of recorded cases, it is still almost new ground.

The origin of the custom may fairly be seen in the common tendency to deify a king; in the early use of imposition of hands for mystical purposes; and particularly from the inability of the medicine man to ease these—Strange people

> All swollen and ulcerous, pitiful to the eye,
> The mere despair of surgery.

Although the practice can be traced in very early times, our Eadward the Confessor was the first who in England thus used "the sanctity that heaven had given his hand." Petrus Blessensis, an Archdeacon of Bath, mentions about 1180 that Henry II. touched, and we must assume that the custom continued; but it is not until the time of Henry VII. that any other direct evidence is met with, and this is from the form of prayer then used by the priest having been preserved. The notion of this cure, says Oldmixon, was kept up after the Reformation by those of the priesthood who were for returning to Popery, as under it they were in possession of miracles, of exorcising, of absolution, &c., very beneficial to them in profit and credit.

Elizabeth was very successful with her cures, a surgeon of the time declaring her "the only day star, peerless and without comparison, whose sacred and blessed hands would presage a divine and holy curation" He then prays that she may for ever reign (if it please the Lord God), even to the end of the world. The Papists later, in the time of Charles I., through Richard Smith, titular Bishop of Calcedon and bishop of this Western District, declared this success due to the sign of the cross used, and not to any power in the Queen. This point had arisen before, the practice being

disliked by many as savouring of Popery and implying a mystery, and so it was discontinued by James I.

The proceedings were simple. The patients having been passed by the surgeons, were admitted to the royal presence, when their swellings were stroked by the royal hands, whilst a minister standing by ejaculated short prayers. A ribbon having attached to it a small gold coin value 6s. 8d. was then put round the neck, and this was expected to be worn until the invalid was "full whole." The cure was not expected to be immediate; time was to be allowed, but as with us its effect was not acknowledged. A register was ordered to be kept in every parish of those who were thus "healed," but this was very carelessly obeyed.

Besides the public healings there were also private ones, probably for the "quality." In 1631, Lord Poulet had a child so much afflicted that she was not expected to survive, and as a last resource she was sent to London to be touched by the Royal hand. Lord Dorchester, Secretary of State, took the child, and on her return home her father's delight may be best told by himself in a letter now in the State Papers. From Hinton, 30th April, he wrote :—

"Ye returne of my sicke childe with so much amendment hath much revived a sicke Father, who with age, gout, and then an ague and since taking of physicke am brought very weake, ye debilitye I feele rather gaininge uppon me than I uppon it. I am much joyed that his Majesty was pleased to touch my poor child with his blessed hands, whereby, God's blessing accompanying that means, he hath given me a child which I had so little hope to keep, that I gave directions for her bones, doubting she would never be able to return, but she is come safely home and mends every day in her health, and ye sight of her gives me as often occasion to remember his Maties gratious goodnesse towards her and me, and in all humilitye and thankfulnesse to acknowledge it. Thanks from my wife and myself to you and your noble lady for ye honour you did us to be troubled with such a guest."

But this power which brought Royalty so much credit was not to be allowed without opposition; others claimed it from time to time, one superstition begat another. Especially was it claimed by a seventh son, never a wench being born between, or better still the seventh son of a seventh son, born under the same condition. The actors were called Strokers, and occasional notices of their existence may be met with, but the following Somerset case must be unique, the first and only one in which the proceedings and routine are actually and officially told. As any great success would lessen the value of the Royal privilege such a claim could not be passed unnoticed, and this case occurring in the time of Charles I. was, as usual under Archbishop Laud, referred to the local bishop for inquiry, with orders to report the name of "Ye father of ye 7th sonne that doth cures in Somersetsheer." The King's Council under date 30 September, 1637, wrote to the bishop, that they had heard that the father, under the above pretence, undertook to do divers cures, and thereby had abused divers of his Majesty's subjects; the bishop was therefore to call the offender before him as well as any with whom he had had dealings. This letter is signed by

Ld. A'bishop of Cant.	Ld. Great Chamberlain.
Ld. Keeper.	Earl of Dorset.
Ld. Treasurer.	Ld. Cottington.
Ld. Privy Seal.	Mr. Treasurer.
	Mr. Secy. Windebank.

The bishop obeyed, and writing from Wells on the 18th Nov. sent his report. He found that the father was William Gilbert, *alias* Yeaton, of Prestley, in Doulting, and the actor his son Richard. Gilbert had been a butcher, but was then a husbandman, having exchanged a copyhold and a lease at Evercreech for another at Doulting, equal to about fifty pounds a year. He was reputed an honest man, with a good understanding but no learning, only much given to talking and bragging. The child's age was five and three quarters, and it seemed that widow Yeaton the

grandmother, who did the office of midwife at the child's birth, which occurred on a Sunday, remarked in the hearing of the child's parents and others, that he being the "seaventh sonne and noe daughter borne between" should by his touch, especially before he was christened, "be fortunate in doing cures," and cure any "wenne," and heal it. This being duly announced, John Norton, a weaver, dwelling in Evercreech where the child was born, having a "wenne" in his neck which much troubled him, and was a hindrance at his work, went to Gilbert's house on Monday, the morning after the birth of the child, and was there "stroaked with the hand of the sayd child." The Sunday after this the child was christened, and at the dinner which followed it was again openly asserted that as being the "seaventh sonne he might doe wonders."

But jealousy arose from the curious fact that another similar case occurred in the neighbourhood about the same time, and that at the birth the same midwife was employed.

This was with one William Hobbs, a yeoman, dwelling near Prestley, and Joan, his wife, who declared that they "alsoe had a seaventh sonne, never a daughter beinge betweene, borne about the same time when the sayd Gilbert's sonne was borne, but the widdow Yeaton, who was the midwife, did not speake anythinge to them at all that a seaventh sonne had any such virtue in him." Here the judicious widow saw no speciality, made no claim for this boy, intending that her own grandchild should be the only wonder-worker thereabouts. This self-assertion was rewarded and Gilbert's child alone was sought.

About three quarters of a year after the christening Henry Poyntinge, of Kilmington, a yeoman, one who had some skill in bone-setting, being at his brother's house at East Pennard, saw that his niece Rebecca, about fourteen years old, was suffering from the king's evil, having a swelling in her neck. He mentioned to her parents that he had read in a book he had at home that the "seaventh sonne of any one who had not daughter borne

between" could cure such infirmities by touching, and so persuaded Rebecca to go to Gilbert's, at Prestley, for the purpose; and this she did, being the second party that the child had touched.

Bishop Pearce on hearing of this book caused Poyntinge to bring it to him, when he found it to be a collection of receipts, without any author's name, entitled—"A Thousand Notable Things of Sundrie Sortes, whereof some are wonderfull, some strange, some pleasant, divers necessary, a great sort profitable, and many very precious," printed in London, 1612. The author was Thos. Lupton, and the words relating to the subject are—"It is manifest by experience that the seaventh male child by just order, never a girl or wench beinge borne between, doth heale onely with touchinge, through a naturall guift, the King's Evill, which is a special guift of God given to Kinges or Queenes as dayly experience doth witnesse."

This book helped to confirm the country people in their opinions, as they easily believed "what they found in print." Simply believing probably what every one else believed, Gilbert gave way to those who came, and the work for the child so increased that a rule or plan of procedure was drawn up. The touching took place on Mondays in the morning—the child fasting; the applicants who were directed to come also fasting, were then touched three Monday mornings "in a row," otherwise it was considered there would be no cure. Before the child could speak no words were used, some one simply "did stroake the soares" with the child's hand; but as soon as was possible he was taught to do all himself, and to say to every one as he stroked :—"I touch and God heales." Inquiry was made to discover who had originated this plan; the child said that Thomas Bisse, the schoolmaster at Evercreech, had taught him to say the words used, but the "sayd Bisse being examined would acknowledge noe such thinge." The father said that Henry Poyntinge "sett downe the aforesayde methode," and we can well see the bone-setter and reader of old books busy at the task,

but on being interrogated he "utterly denyed the same." Some had advised Gilbert to have prayers read, but this was not done, no doubt to the great relief of the bishop's ideas of propriety. The repute of the child's powers seems to have grown with time, as for the first four years or so he touched but twenty only, but from the spring to September in this year, 1637, there came eight or nine every Monday, and from the beginning of September there came sometimes thirty, sometimes forty at a time, besides those who accompanied them, and this not only from Somerset, but from "divers other counties." Amongst these were many persons of "quality," and so numerous was the assemblage that the inns, ale-houses, and private houses in and about Presley were entirely filled. A book was kept of the names and conditions of all who came; and if this should happen to be at Wells it would be a curious and interesting record.

As to the success of the child's work, opinions differed, whilst some asserted that many were cured, others said but few benefited. John Norton, the first touched before the christening, as also Rebecca who was touched next after that event, both acknowledged that they were eased within a short time; Norton's wen abated and Rebecca's broke and healed; and both considered this the result of the touch.

Others who had been touched agreed that they "within a while after grew better," but would not in their "misconceit and mistakinge" consider the medicines they may have before taken, nor the state or ripeness of the abscess at the time they were touched. They grew well after the touching, and of course the touching was the immediate cause. Some however were not a "whitt" better, and it seemed that the boy had "touched" his mother for a swelling in her feet, "but did noe good at all." It was forgotten here that the cure was for the Evil, and it by no means followed that every swelling would or could be benefited. Then came the important question, whether the father had received money or gifts for the boy's work, or "contracted for any by himself or

others." The child would take no money, always declined, declaring that then he could not heal; but fruit, sugar, points, garters, "skarfes" and such like trifles were given and taken. The father had not benefited nor used "any imposture or deceipt" but was only carried away by a "simple credulity;" the whole business making him "a little vain-glorious, and swell into a higher conceit of himself than formerly he had showed."

The result of the inquiry was that the Bishop "did straightly charge and Command" Gilbert not to suffer his child to touch any more, "as he will answeare the contrary at his perill," and to this he promised Obedience, although he expected to be much troubled in putting off the people who would persistently come. In time by perseverance he succeeded, and they "gave over" coming, and so far as we can know the practice was discontinued.

Although it was easy enough to see "simple credulity" and "misconceit" in this case, it was not to be observed in the case of the King. During the time of Charles there was much healing and many proclamations about it. A little later it seemed likely to give trouble. In 1643 after the King had gone to Oxford the question was raised by a pamphlet, as being the humble petition of divers hundreds afflicted who could not be cured because of his Majesty's absence, the cure being "proper only to our English Kings, no Soveraigne else having that miraculous vertue," and so "deceased" wretches as they were they were left to possess their souls without their bodies, enduring a thousand deaths, "dying every day alive." Again when the King was a prisoner at Holmby, the people "flocked" there to be touched; "a pleasant imposition on the populace," remarks Oldmixon. So great was the concourse that the Parliament issued a proclamation declaring the business a superstition.

On the restoration of Charles II. the practice was revived, and during his reign he touched 92,107 persons. Easter and Whitsuntide had been the usual chief times, but now as having a more suitable temperature Michaelmas was substituted for the latter.

In August, 1682, 49 only were touched, but in April 2471. Of these there are two cases recorded from Somerset. Mr. Edwards, of Curry Rivel, was so sorely afflicted that both sides of his face were ulcerated, he was blind, could scarce see the sun or moon, and was altogether a most sad spectacle to view. He went to London, was touched, and within six weeks was seen whole, his eyes perfect, his face covered with new flesh like that of a young child, and so he lived without relapse.

Again, Marmaduke Ling, of North Petherton, had a large swelling in his face, very hard, and "monstrously extended," was touched for it, and within fourteen days the swelling grew soft, and in six weeks it was gone.

The next case has been mentioned shortly in the general history of the time, and is that relating to the Duke of Monmouth during his progress or visit to Somerset in 1680. Elizabeth Parcet, about twenty years of age, had languished for ten or eleven years under this joint evil. In her right hand she had four running wounds; two more on the same arm, and between the arm-pit she had a "bunch" which the doctors said fed the other wounds; her left eye also suffered so that she was nearly blind. The surgeons had "tampered" with her but did no good; she had gone also ten or eleven miles to a seventh son, but all in vain. Being miserably poor she could not get to London, but on learning that Monmouth was at Mr. Speke's at Whitelackington, "God, the Great Physician, dictated to her" that if she could but touch the Duke she should be well. Hearing that Sir John Sydenham intended to entertain him at White Lodge, Hinton Park, she went off there with many neighbours, waited and watched, and seeing her chance she pressed in and caught the Duke by the hand, but alas both were gloved, she to cover her sores, and so she was not satisfied. Watching again, another chance offered when she tore off her glove, which had clung to the sores, and the Duke's glove as chance would have it hanging down, thus leaving the wrist bare, she caught him there with her

running-hand saying, "God bless your Greatness;" to which he replied, "God bless you, my girl." Transported with her success, she at once went off in great joy, telling all that she should now be well. To the admiration of all who knew or heard of it, in four or five days her wounds were dried up; in eight or ten days the bunch was dissolved, her eye became perfectly well, and she in good health.

After the custom of the time with Chap book narratives, whoever doubted the truth of this in print, could see the original relation under the hands of the various witnesses, at the Amsterdam Coffee-house, in St. Bartholomew's Lane. The story was told more than once, as in the following broad-sides:—

"His Grace the Duke of Monmouth Honoured in His Progress in the West of England in an account of a most Extraordinary Cure of the King's Evil. Given in a Letter from Crookhorn, in the County of Somerset, from the Minister of the Parish and many others." (*Single Sheet folio*, 1680.)

Another is:—

"The Extraordinary Cure of Elizabeth Parcet (a poor widow's daughter) of the King's Evil (being afflicted with 4 runnings in her hand and a large bunch near her breast) by touching the Duke of Monmouth at the White Lodge, Henton Park in Somerset, with the names of the Witnesses who testify to the fact." (*Single Sheet folio*, 1680.)

And again there was the—

"Account of an extraordinary Cure of the King's Evil sent from Crookhorn in the County of Somerset, attested by Henry Clark, Minister of the said parish; Captain James Bale; Captain Richard Shirlock; John Stackey, clerk; William Pike; Samuel Daubeny; George Strong; John Greenway; Robert Chiflet." (*Folio*, 1681.)

But as may be supposed the opposite party had their say, and there was issued:—

"A Canto upon the Miraculous Cure of the King's Evil, performed by the Duke of Monmouth."

The poet here sings:—

"Some have
A Saint to whom they have recourse,

As to Heaven's Master of the Horse,
So to his Grace of Monmouth trots
A filly foal that had the Bots;
But had you seen the skittish jade,
You would have thought her drunk or mad,
For at first dash his hand she seized,
Much was th 'ambitious Hero pleased.
The witch her dam had set her fancy
Agog upon this chyromancy."

Another ballad is entitled :—

"A Canto on the new Miracle wrought by the Duke of Monmouth, curing a young Wench of the King's Evil, as it is related at large by B. Harris in his Prot(estant) Intelligencer, publish'd Friday, Jany 7, 1681." (*S.S. fol.*, 1681.)

Here we are told the :—

"Great mountebank of our sick state
* * *
Long in his fist the Leprous drab
Paddled and pored familiar scab."

The girl being pleased, *

"To touch a prince though in disguise"
Much less a Prince so kind and civil."

At Taunton, when there later on his fatal expedition, the Duke having assumed the title of King, touched openly as by right divine. At his trial he was charged with "exercising the functions of Royal dignity, and with having touched children for the Evil at Taunton;" or as it was put at the trial in Scotland, where he was charged as the Duke of Buccleugh as having with thousands in "open rebellione invadit the toune of Tauntone, and ther the said laite Duke of Buckleugh did usurp the style of King and touched for the Evil."

King James, as may be supposed, claimed fully all his prerogatives and touched weekly, sometimes oftener. In April, 1686, he announced that he should discontinue this during the summer, except on special necessary occasions, or when on his progress. The progress for this year commenced

in August; on the 23rd his Majesty left Windsor and reached Marlborough, the Duke of Somerset's house; on the 24th he arrived at Badminton about five p.m., and then next day, passing by Cainesham bridge, about five o'clock he reached Bristol. Two miles out he was met by the Bishop, and by Colonel Kirke who was there with his regiment. Within Bristol as part of the reception, was the curious sight of two hundred masters of ships on horseback, and a thousand seamen lined the streets. Having stayed at Sir William Haynom's house, on the 27th August about six in the morning the King left Bristol, where he had touched a great number, and went to Weston Moor, that is Sedgemoor, to view the battle field of the year before, where Monmouth was defeated. This fact has not been before noticed. Accompanied by the Mayor and Aldermen in their "formalities," the people "following with acclamations," says the *Gazette*, but one can hardly believe it, he arrived at Bridgwater about five in the afternoon. Proceeding thence to Wilton, in due time he reached Windsor.

In the next progress, in 1687, Bath was visited. The King and Queen left Windsor on the 16th August. The Queen going by Marlborough reached Bath on the 18th; the King went first to Portsmouth, and thence arrived at Bath also on the 18th, and stayed there the 19th, 20th and 21st. On the 22nd he left bound for Chester, and was accompanied to the gates by the Mayor and Aldermen, and without them was met by the Sheriff and gentlemen of the county, who accompanied him to their "utmost borders." On Lansdown appeared the Duke of Beaufort, who conducted his Majesty to Badminton, where there was a "most extraordinary noble entertainment." So Gloucester was reached about five in the afternoon. Returning from Chester, by Oxford and Ciceter, the King joined the Queen, who had remained at Bath, on the 6th September "well pleased with his trip." The Mayor and Aldermen met him at the gate, and walked bareheaded before his coach, having also made preparations "to testify

their joy" in a public manner, but his Majesty "accepting their intention" forbade anything more to be done.

During this progress the King touched five thousand persons, but it was found that the registration which should have been followed in every parish was so carelessly done that many came who had been touched before, and thus got a second piece of gold, "contrary to established order." "The touch of the King," wrote one, "carried so much Divinity in it that physic was nonplus'd and surgery tied up;" more were cured in one year by that "salutiferous faculty" than by all the physicians since his accession. So great seems to have been this confidence that some were found trying it for the "fystle, or French pocke."

It was during this visit to Bath that the episode occurred as mentioned by Warner, p. 257. Notice was given, a sudden or short notice, that the King would touch in the Abbey after the daily morning prayer. Being now an avowed Papist, he had altered the short form which had been used on such occasions and had introduced the intercession of the Virgin. This was the only alteration that he could make as, although the form was bound up in the Prayer Book, and so remained through the time of Anne, and even, although never used, in the early reign of George I., it was not used in a church, and was not a part of the authorised services. Whether James used it in Latin or English is not certain. Warner, acknowledging that he wrote from tradition, says that the altar was popishly decorated, that other popish mummery was introduced, and that after the healing the King's Confessor suddenly mounted the pulpit and preached a popish sermon, Bishop Ken being present, but not interfering until it was over, when, begging the congregation to remain awhile, he in turn preached, and so eloquently as to confound his opponent. A little examination will now sift the truth. In the "Life of Ken," by a Layman (J. L. Anderdon), a letter is printed (p. 254), in which Ken reports the circumstance to the Archbishop, and also his own conduct resulting. There was a great healing, he writes,

and with but little warning, only a flying report, so short was the notice that he had no time to remonstrate, and if he had "this would only have provoked," so, as there was no other place "capable to receive so great a multitude as came for cure," he remained passive. The "office" was consequently performed in the church, between the hours of prayer. Ken's intended remonstrance here does not suppose any popish decorations or preaching, but was simply against the church being used for the purpose of the healing. But, after what did occur, he continues, being well aware what advantage the Romanists would take of any "seeming complyances," and to obviate all misrepresentations that they might make, "he took occasion on Sunday to preach from the Gospel, of which the subject was the Samaritan, and the tenor of his sermon being Charity, pointing out that although the doors of the church may possibly be open to a common work of charity, they could not be open to a different form of worship. This, he concludes, was "the substance of what I said upon that action." Although the office took place between the hours of service and not as a part of it, "that action" against which Ken protested would be not only any "Popish mummery," but the use of a foreign or unauthorised form of prayer. That a popish form was given to the "office" is clear, but what took place more exactly is not at present in evidence, not even that the Confessor preached or addressed those present—a sermon certainly was never a part of the ceremony. But it is clear, contrary to tradition, that Ken, even if present, did not publicly notice "the action," or preach on it until the Sunday following.

Another circumstance which has got mixed up with this event, and which perhaps accounts for the preaching story, can now also be cleared up.

Ken's sermon was not printed; but it happens that there is a pamphlet published in this year, 1687, which is an answer to a sermon by Ken, and it has been assumed that it was an answer to this sermon on charity.

The pamphlet is entitled :—

"Animadversions, by way of Answer to a Sermon preached by Dr. Thomas Kenne, Lord Bishop of Bath and Wells; in the Cathedral Church of Bath, on Ascension Day last, being the fifth day of May, 1687. With allowance."

Ken's sermon here alluded to was, like the other, never printed, but it will be observed that this one was preached on Ascension Day, in May, whilst the healing and the sermon on the Sunday following it occurred in September. The author of the pamphlet was a Jesuit, one John Reed, who attended the Abbey on purpose to hear Ken, and then, with the assistance of others, put together his work, in which, says the *Athenæ Oxoniensis*, was never so much ignorance and impudence in so small a space.

But one full year after this there was published :—

"News from Bath, being a true and perfect Relation of the great and splendid Procession, and joyful Transactions there, on the 11th day of April, being the Coronation-day of their most Sacred Majesties William and Mary, King and Queen of England, Scotland, France, and Ireland."

Bath was also gaily singing a ballad on the same subject; setting out :—

"The Loyalty and Glory of the City of Bath, being a True and Perfect Relation of the Wonderful Ceremony and Transactions that were lately performed there."

William declined to touch, but on being urged it is supposed that he did so on one occasion, when, it is told, he so far improved the "office" as to pray not only that the man may be made whole but that he may have also more sense.

The practice was revived by Anne, as being a political claim to her position by right divine; she was the last sovereign who troubled to use it. Accompanied by his Royal Highness (*i.e.*, Prince George of Denmark) the Queen visited Bath in 1702, arriving on the 29th of August, about eight o'clock in the evening, from Badminton and Oxford. On Lansdown she was met by the Sheriff and his men, and at Hide Park, about a mile

from the city, she was met by "a handsome company of citizens" all clad like grenadiers, and also by two hundred virgins with bows and arrows, and others with gilt sceptres, with them being a set of dancers who danced by the side of the coach. At the West Gate she was met by the Corporation in their "formalities," and a procession formed. Preceded by the High Sheriff and his men well-mounted and in blue cloaks, there came divers citizens as artillerymen with arms, then the dancers, the Corporation two and two, the M.P., and then the Mayor before the coach. By the side of the coach flambeaux were carried, and after it came music, and then the maids. With the streets illuminated and the bells ringing for joy, her Majesty was conducted to the Abbey House (Dr. Peirce's), where the Mayor and Corporation kissed the Royal hand.

It was at the Abbey House, or Abbey Gate House, says *A Companion to the Watering and Bathing Places of England*, 1800, that King James II. and his Queen also stayed ; why should not Elizabeth have used it too? It was destroyed in 1755, when the Kingston Baths were built, but its site is marked in Johnson's map of 1634, in that very scarce little work "Mercurius Botanicus."

During her stay the Queen touched, but the practice was clearly declining. A "great number" came, but Dr. Thomas Gardiner, her Majesty's physician, after an examination, chose to find only thirty fit, and these were touched privately ; because there was not "a proper conveniency for the solemnity."

Thus the reason which James had used to get off his trick in the Abbey Church, was used now to get rid of a troublesome business.

After a stay of six weeks, during which time there had been a daily mail, the post went and came every day of the week, the Queen left Bath for Windsor on the 8th October. The Corporation accompanied her to the North Gate, and the Mayor there presented a silver gilt cup with a cover, and a salver, all in a rich case of crimson velvet lined with gold. The visit is commemorated in—

"The Queen's Famous Progress, or her Majesty's Royal journey to the Bath, and happy Return. With the most remarkable particulars of her royal entertainment at Oxford, and glorious and triumphant reception at the Bath. Her touching for the Evil, as also how 200 virgins cloathed in white, met the Queen with Bows and Arrows by their sides, &c. &c. &c."

This was followed by another addressed as from "The two hundred maidens at the Bath, to the Virgins in Oxford."

Her Majesty's outlay, "money disburst" at Bath was £307 1s. 10d., and there was a charge for a new leathern bag for ye green velvet carpet, and a new trunk to carry ye standishes, pens and paper, to Bath and other places.

Anne seems to have been pleased with her trip, or to have met with Hope who told her a flattering tale, as the visit was repeated. In the State Papers of 1703 there is an application from the Keeper and Guide of Roads, for allowances to his messengers sent to give notice of the state of the roads should her Majesty go to the Bath. These were reported so bad that there could be no passage, and it was suggested that the Attorney-General should prosecute, that a Road Surveyor should be appointed, and the roads indicted. This difficulty was got rid of in some way, and the Queen with the Prince left Windsor on Wednesday, the 18th August, and going by Marlborough stayed at Lacock, Sir John Talbot's, and arrived at Bath on the 20th, about seven o'clock. On Kingsdown she was met by twenty chairmen with sedans, appointed to carry her down the hill if she wished it. At the North Gate she encountered the Mayor, who delivering the keys of the city, duly received them again, and then, accompanied by the train bands and music and bell ringing, the streets, balconies and windows being adorned by a vast number of people, his Worship preceded the Queen and conducted her to her lodgings at Dr. Peirce's.

Dr. Peirce had written on *The Effects of the Bath in Curing Palsy and Barrenness*: a favourite fallacy of the faculty from an early time.

There seems to be no record of any healing during this visit, which terminated on the 7th October, Windsor being reached on the 9th. The charges for "lodgings and goods" during this stay amounted to £439 4s. 6d., being £418 6s. 6d. actually expended and £20 18s. fees to the Treasurer at 12d. in the pound. The Cupbearer in ordinary received for his travelling expenses, at 10s. per day, £27. A gentleman of the Chapel Royal, at 3s. per day, £8 2s. The Carver in ordinary, at 10s. per day, and the Server in ordinary at the same rate, each £27 ; and Dr. Edward Haines, Principal Physician, at 15s. per day, £40 10s.

Time now brings the question—When or on what day exactly was the last public touching ? and this I think is here noted for the first time. In the *Gazette*, 1714, it is announced that it was Her Majesty's intention to touch publicly on Tuesday, the 2nd March, and so to continue for a time. This was followed in the *Gazette* of May 1st by another notice that Her Majesty would discontinue touching for that season. The last public touching was therefore on the Tuesday before this announcement, and this would be the 27th April, 1714.

The Queen died on the 1st August, 1714, and the practice has been discontinued by our present Royalty. But the claimants to the Crown of George I. claimed also this divine power, although they had no opportunity of showing it. There is one case recorded however, which happens to be that of a Somerset man, and which is presumably the very last which occurred. Newspapers have now come upon the scene, and this is told in the *General Evening Post* of 7th January, 1748. Carte, in his History of England, gives the story as a fact, as supporting the Pretender, but so strong was now the feeling against it that the narrative destroyed the credit of his work and stopped its completion. Christopher Lovell was a native of Wells, a labourer, who going to Bristol, got work at "turning the wheel for the pewterers." He became extremely afflicted and a miserable object, having tried all remedies in vain. Eventually his uncle,

a mariner, got him in August, 1746, a passage in a ship to the Isle of Rée, and from thence he made his way to Paris, and then to Avignon, where he was touched in November by the "eldest descendant of a race of Kings," but one who had not been either crowned or anointed; the desired result however followed, the sores healed, and Lovell so gained in strength that he returned in January in perfect health. Some including the surgeon who had "tried in vain for three years" to cure him, considered the case, if not miraculous, as one of the most wonderful events that had ever happened.

But with others all this became a pious fraud, a fallacy, an idle Jacobite tale, to support the old threadbare notion of a divine hereditary right, long exploded by men of sense. It was clear enough that change of air and a long course of varied exercise, with a change of diet from the coarse scorbutic food to which he would be accustomed, to the light vegetable diet of France, with the voyage to and fro, had produced the effect. This lasted but a short time, the sores broke out afresh, and Lovell returned to France hoping again for aid, but died miserably on the road. As one writer puts this case, he went to a "certain nameless, hereditary, unanointed Prince, succeeded, was healed, returned home, relapsed and died. Q.E.D."

But although the Kings had discontinued the now discredited custom, belief in its virtue was not likely to be as suddenly wholly discarded. As late as 1814 there was a certain Thomas Draper, who assuming the medical prefix of Doctor, became known as Doctor Touchem, and by his cures got a great repute about Bridgwater, where he resided. He was tried twice at Quarter Sessions for using subtle craft to deceive. At the second trial, October 17th, 1814, a numerous assemblage of all ages attended to prove their restoration to health, and this without either medicine, fee or reward; and on getting an acquittal, he left the court "amidst the shouts and blessings of an approving multitude." Two single sheets printed at the

time, but differing widely in tone, tell the tale and hand it down to us. One much regretting the result of the trials is entitled :—

"Acquittal of Thomas Draper, *alias* Dr. Touchem, at the Quarter Sessions for the county of Somerset, held on Monday, October 17th, 1814."

The other, which is headed "Trial and Acquittal of Doctor Thomas Draper" begins :—

"It is with sensations bordering on rapture, we announce the triumph of Innocent and humble merit over prejudice and oppression. That extraordinary man will now be at liberty, after long persecution, to exercise his wonderful art. Humble in birth, lowly in situation, and mild in manners, his every action tends to do good."

It may perhaps be allowed here to notice yet another downward step. In the *Globe* of October 9th, 1882, it is recorded that a gipsy woman was sent to gaol for professing to rule the planets having represented herself as the seventh daughter of the seventh virgin Jupiter, and so in possession of a special faculty for seeing into futurity.

Reflecting a little it can be seen how strong this belief was, and as regards the King or Queen how much it was encouraged. Mr. Pepys of course saw the performance, done with great gravity, "an ugly office and a simple one." Evelyn mentions that in 1684, six or seven persons were killed in the crush to get tickets. Under the advice of Sir John Floyer, a physician not unconnected with Bath, Dr. Johnson was touched; "wonderful to think," as Boswell remarks in alluding to the circumstance. Notice is often found that a Nonconformist was touched, at first the implication seems to be that heaven could not be expected to favour such a one. In time however it becomes clearer that it was from the Nonconformists that protest came; hence it was strange that an unbeliever should trouble to try it. A Nonconformist's wife wished to be touched, but her husband told her it was a piece of delusion, a superstition, that there was no more virtue in a king

than in any other man. This was evidence of disloyalty, a denial of the royal prerogative, of the "right divine to govern wrong."

It was from a circumstance of this kind that Mr. Rosewell of a Somerset family, and of Dunkerton, but who eventually settled at Rotherhithe, was brought to suffer much. In a sermon he had said—or was charged with having said—"that the people made a flocking to the Sovereign upon pretence of healing the Evil, which he could not do." This being reported to Jefferies, a trial and much persecution ensued, the result however being an acquittal.

All such unbelievers received many hard names, as usual; especially were they Atheists, still the ideal epithet for stopping an opponent; and also were they Sadducees and ill-conditioned Pharisees. As there is a lesson always to be sought and to be found in the records and the credulity of the past, what shall we learn now? Can we say, as Dr. Oliver in one of his Essays on the Bath waters implies, when alluding to the cure by the seventh son, that the fault was with the people—*Si populus decipi vult decipiatur*; or, if we say that the fault was rather with others, can we say that we are less thoughtless towards or less submissive to credulity than our ancestors? Rather will not our successors a hundred years hence be investigating our beliefs, then passed away, and wondering at us, as we now curiously wonder at this story of the Cure by Touch?

Notes on Autumn Excursions on the Mendips, by J. McMurtrie.

(Read February 14th, 1883.*)*

Having nothing particularly new to bring under the notice of the Club, the writer had no intention of contributing to the present year's proceedings, but in deference to the wishes of the

Secretary who is anxious that Geology should not be lost sight of, he has undertaken to furnish a few notes of some excursions in the Mendip country during the past autumn.

It cannot but be regarded as a matter of regret that in Bath, which was really the birthplace of Geology, and around which there is a greater variety of strata and greater facilities for studying Geology than are enjoyed in any other part of England, so few have hitherto devoted their attention to this branch of science; but it is to be hoped the splendid example put before the Club by Mr. Charles Moore will not be lost, and that others may be induced to follow in the path in which he attained so much distinction.

In the notes which follow the writer would only ask the members to accompany him in a few Saturday afternoon excursions, which formed a substitute for a better holiday, and if they should thus be induced to wander off upon similar rambles, the object of these notes will have been fully accomplished.

INTRODUCTORY.

In meetings of this kind, it is always better to assume that amongst the audience there may be some to whom the teachings of Geology are not familiar, and the writer would first of all point out, very briefly, the general structure of the rocks in the district around the Mendip Hills.

The great central feature is the Mendip range, stretching from Frome by way of Shepton Mallet and Wells to Weston-super-Mare, where these hills are lost beneath the waters of the Severn.

The ridge consists of a central mass of Old Red Sandstone, divided in places by masses of igneous rock and upheaved by some force from beneath, its beds being almost perpendicular. This is the foundation rock of the district, no older sedimentary rock being met with until we get west into Cornwall or north towards Tortworth.

The Mountain Limestone Shales, Mountain Limestone and Millstone Grit come next in ascending order, but, tilted up by the older rock on which they rest, they dip north and south from the central ridge.

Next in upward succession follow the Coal Measures so largely developed on the north of the Mendips, but the existence of which to the south is still a matter of speculation. At the close of the Coal Measure period there occurred a great break, when the Mendips were upheaved, and their upturned summits washed away; after which followed the deposit of the secondary rocks on a comparatively level surface, consisting in ascending order of the New Red Sandstone or Keuper, the Rhætic or Penarth beds, the Lias, Inferior Oolite, Fuller's Earth and Rock and the Forest Marble.

EXCURSION TO OLDFORD AND SPRING GARDENS NEAR FROME.

On the north side of the road stretching from Spring Gardens to Oldford, there exists a narrow strip of Old Red Sandstone, and associated with it a patch of Mountain Limestone which have a special interest. Although familiar with the same formations in other parts of the Mendips, the writer had never had an opportunity of examining these the most easterly outliers of the group, which are here seen for the last time in the south of England before they pass beneath the secondary rocks. The areas in question lie in a narrow belt between the road to Oldford and the Froom river, and they may be examined in a few quarries by the road side, but their exact outline is difficult to trace. Farther west on the Mendips the Old Red Sandstone generally lies at a high elevation, attaining at Black Down a height of 1067 feet above the sea; but in passing to the eastward the ridge gradually descends to the level of the surrounding country, then passes beneath the overlying strata to reappear no more on this side of the channel, although it is met with again in France and Belgium.

A question naturally arises as to whether the Mendip ridge, thus gradually passing downwards to lower levels in its passage eastwards, may finally flatten out beneath the Secondary rocks, and cease to exist as an anticlinal ridge; but the fact that at this the most easterly point, at which we have an opportunity of examining it, the Old Red Sandstone comes to the surface, and that both that formation and the Mountain Limestone lie at high angles, is direct evidence to the contrary; and the existence of what appears to be a corresponding anticlinal in the Ardennes, has led to the conviction, that there must be a subterranean extension of the Mendip chain throughout the south-east of England.

Being the most easterly landmark indicating the southern margin of the Somersetshire coalfield, this bit of old Red Sandstone has an interest peculiarly its own, and it suggests many speculations as to the course of the same ridge eastward beneath the overlying rocks, and as to the prospects of finding coal adjacent to it of which at present we have no proof. In connection with this subject, however, it must be noted, that although the older rocks do not again come to the surface in the south-east of England, they have been proved by several borings in the neighbourhood of London. At Meux's Brewery in London an important boring was put down in the year 1877, which, after passing in succession through all the strata between the London clay and the lower Green-sand, entered certain mottled red, purple and green shales, which Mr. Etheridge had no difficulty in identifying as belonging to the Upper Devonian. They were met with at a depth of 1064 feet and were cut through to a depth of 80 feet, the cores showing a dip of 30° and yielding organic remains, which enabled Mr. Etheridge to speak with absolute certainty of their Geological age.

Another boring was put down at Ware in Hertfordshire (about 20 miles north of London), which, after passing through Chalk and Green-sand to a depth of 196 feet, proved the Upper

Silurian or Wenlock Shale, lying at an angle of 40 degrees. Details of these borings will be found elsewhere, and in connexion with them the writer would ask, whether in the Silurian of Ware we may not recognise an eastern extension of the Silurian of Tortworth, and in the Devonian of Meux's brewery a continuation of the Mendip anticlinal, although so many miles of unproved country lie between. It would certainly be interesting to see the result of a boring midway between London and Ware, where, if the parallel held good, a counterpart of the Somersetshire Coal field might possibly be found, but it is just a question whether the Carboniferous belt, if such exists in the south-east of England, should not be sought for farther south.

Although in the district extending from Nunney through Frome to Oldford, the older rocks present a very small superficial area, only coming to the surface here and there at intervals, in belts, where ravines have cut through the Secondary rocks; the overlying strata seem to be very superficial, and it is probable that there is a large area around Frome, beneath which the Old Red Sandstone and Mountain Limestone may be expected to lie at no great depth.

ROAD SECTIONS AT SPRING GARDENS NEAR FROME.

In the same locality there is a recent exposure of the Secondary beds, which has not hitherto received special notice. The Radstock branch of the Great Western railway formerly crossed the roads near Spring Gardens on the level; but within the last two years they have been carried under the railway by means of deep cuttings, affording good sections of the surface rocks, which here present conditions which the writer was unable at first to recognise.

The locality in question is exactly where, according to the Ordnance maps, the Fuller's Earth crops out on the top of the Inferior Oolite, and where the latter rock might naturally have

been expected in the cutting; but it presents features of an abnormal kind which have not previously been observed by the writer. Instead of the ordinary coarse earthy Oolitic Rock, of a yellow colour familiar in the Inferior Oolite; there occurs here a hard Silicious rock of a blue and grey colour, so hard that it rings under the hammer and is very difficult to break. The strata are not however uniformly of this description, for here and there in the cutting the beds present more of an Oolitic character; but this constantly passes into the hard crystalline rock described which is the predominating feature in the cutting. In places these harder masses rise up from beneath in bosses of a colour resembling Mountain Limestone, for which at first sight they might be mistaken, but the fossils they contain do not agree with this, and the way in which the same beds pass from an unmistakable Oolitic character into the Silicious structure described, seems to show, that the beds are merely Inferior Oolite under exceptional conditions. From the frequent exposures of Mountain Limestone at points not far distant, probably that formation lies at no great depth beneath this road cutting, and the writer would venture it as a suggestion only, that the Inferior Oolite, where it approaches the Limestone, may, as in the case of the Lias, assume abnormal conditions. The special features described are evidently not confined to one spot, for in the railway cuttings opposite Hapsford. the writer has since observed the Inferior Oolite presenting the same exceptional character.

VALLIS.

Taking a westerly course along the flank of the Mendips, the writer took the opportunity of renewing an old acquaintance with the romantic surroundings of the Vallis, which, both in their picturesque and geological features, have been made very familiar to the members of this Club in the writings of Mr. Moore and others. Under the circumstances any reference to this locality might very well have been omitted from these notes, but in going

over the ground again this autumn, what appeared to be new features presented themselves, which deserve at least a passing notice.

The ordinary section presented in the larger quarries at Eggford and opposite Vallis Farm, in Vallis Vale, is a very familiar one, consisting of a bold escarpment of Mountain Limestone lying at a high angle, but in which the upturned edges of the strata have been planed down to a comparatively level surface, on which has been deposited unconformably a thin bed of Inferior Oolite. On entering the Vallis at Hapsford, however, and before reaching the great quarry worked for so many years at that end of the valley, the writer was attracted by some less prominent exposures of rock on the east side of the ravine, which being partly hidden by brushwood, had previously escaped his notice. The base of the section consisted, as in all the Vallis quarries, of Mountain Limestone lying at a high angle, but it was evident that the superincumbent beds were not Inferior Oolite. The accompanying diagram will serve to explain the relative position of these beds, as seen in three successive quarries at Hapsford, but it must be noticed that horizontally the section has been very much compressed, in order to give a connected view of the succession of strata there presented. Only the broad features, however, are attempted to be shown, for the lower beds are much hidden by *debris*, and a ladder was not available to admit of examining the upper strata.

In the larger and last abandoned quarry at A, and in the southern corner, the upturned edges of the Mountain Limestone are immediately overlaid by the Inferior Oolite; but as the eye passes along the face of the quarry to the northward, attention is at once directed to a bed which comes in almost imperceptibly, between the Limestone beneath and the Oolite overhead, being approximately conformable to the latter. At the northern end it does not exceed 1 foot 6 inches in thickness, and in colour it does not differ much from the Mountain Limestone on which it

rests, but its horizontal position at once distinguishes it from the underlying rock. It consists of a fine Conglomerate, occasionally brecciated, but more frequently containing water-worn pebbles, and it shows traces of fish teeth and scales.

After passing an unopened piece of ground, there is a second and much smaller quarry at B. which presents still greater variety. It consists in descending order of

	Ft.	In.
Inferior Oolite, from ... ... 10 to	15	0
Pale blue shale, with irregular layers of stone and pebbles interspersed, about... ...	1	6
Rhætic conglomerate	0	5
Dark shale	0	3
Rhætic conglomerate	1	8
Dark shale	0	3

beneath which follows the Mountain Limestone. As in the former section the conglomerates contained fish and reptilian remains.

After another short interval of unworked ground, a third quarry occurs at C, in which the section is still farther developed. Taken at the northern end, where the strata are most fully represented, the section may be given as follows :—

Rubbly beds, apparently White Lias ...		
Lias beds, more regular		
Grey Marls, thinly laminated, about ...	3	0
Beds of Conglomerate separated by bands of dark Shale, about	3	0

beneath which lies the Mountain Limestone. There again the conglomerates contained occasional fish teeth and scales, and a closer examination would probably discover a greater variety of organic remains.

The writer had little hesitation in identifying the whole of the beds above the Limestone, in the section last described, as belonging to the Rhætic formation, here presented in miniature

within the thickness of a few feet. The Conglomerate resting on the Limestone was evidently the Rhætic bone bed, the dark coloured marks were probably thin representatives of a well-known bed of Black Marl lying under the White Lias in the interior of the Coal basin, while the light coloured beds of Lias, although differing slightly in lithological character, were doubtless the true representatives of the Rhætic White Lias.

The writer was unable to call to mind, that on any of his visits to Vallis with Mr. Moore this special feature was ever pointed out; but feeling certain that it could not have escaped so keen an observer, a careful search was made amongst Mr. Moore's contributions to various societies, in the hope of discovering some written notice on the subject. And the search was not in vain, for in a paper on Abnormal Secondary Deposits, which he contributed to the Geological Society in 1867, and in a second paper on the same subject in 1880, Mr. Moore has described with much accuracy, and in greater detail, the section here referred to. It was with a feeling of no little gratification the writer found his interpretation of this rock section thus confirmed, and he cannot leave this part of the subject without placing on record, his deep sense of the earnest faithful work done by Mr. Moore in this district. The more his papers are read and studied, the more do they impress us with the thoroughness of all Mr. Moore's work, carried on in the face of much bodily infirmity over a long series of years; and the writer feels assured that the members of this Club will long bear in kindly memory the name of one, who did so much for the advancement of Geology throughout this district.

HOLLWELL.

Although the abandonment of the quarries at Hollwell has put an end to farther excavations, and there is no fresh discovery to be looked for in that direction, the opportunity was taken of rambling over the old ground, in which Mr. Moore made his greatest

discovery. Sufficient is still to be seen of the Liassic veins, to make the quarries well worthy of a visit from those who have not been there; and a very small amount of patience and industry will be rewarded by finding some of those beautiful reptilian and fish remains, which have so enriched the Bath Museum.

The more it is considered the more striking does it seem, that within a few silted up crevices in the Mountain Limestone, there should have been gathered together in so much profusion, the remains of races of animals peculiar to the Rhætic age; but the seas of that period must have swarmed with life, and this old coast line has handed it down for our instruction. Considering how much has been found in one or two limited localities, it ought to encourage others to research, not following too closely in the footsteps of those who have gone before, but striking out in fresh fields and pastures new.

BASALTIC DYKE AND OTHER ROCKS OF DOWNHEAD AND STOKE LANE.

The Basaltic Dyke discovered by Mr. Moore in the neighbourhood of Downhead having been very carefully delineated in the latest edition of the Ordnance maps, the writer had intended, with the assistance thus afforded, to trace out the outline of these masses of igneous rock; but two different excursions to that locality were cut short by the deluging rains of the past season, and beyond submitting a specimen of the rock from near Tadhill House, Leigh-on-Mendip, he has little to say on the subject. Considering how many years elapsed, even in Geological times, before the discovery of these eruptive rocks, it may be open to question whether even now all the areas have been recorded. A farther search in the Old Red Sandstone, on the higher summits of the Mendip range, would be good practice for the student in Geology, and might lead to the discovery of areas not yet mapped.

On comparing the outcrops of the older rocks in the neighbour-

hood of Tortworth, with corresponding outcrops in the Mendips, it seems strange that no vestige of Silurian rock has hitherto been met with there. In the neighbourhood of Charfield Station, the distance from the Lower Limestone Shales across the outcrop of Old Red Sandstone to the nearest point of the Silurian is only 770 yards, and at Tortworth Court the entire outcrop of Old Red Sandstone is comprised within a distance of 550 yards; but although at Downhead, a mile and a half of stratification intervenes between the outcrop of the Mountain Limestone Shales on the north side of the anticlinal and the corresponding outcrop on the south, and steep inclinations prevail throughout the entire area, no trace of Silurian has yet been discovered. The inference to be drawn from it is that the thickness of the Old Red Sandstone on the Mendips must be immensely greater than at Tortworth, but it also suggests the possibility of detecting traces of the Silurian somewhere in the Mendip area.

On looking at the extensive exposure of Trap at Downhead which far exceeds that of all the rest of Mendip put together, it is not surprising that the Carboniferous strata adjoining present evidences of greater disturbance than at any other part of the Somersetshire Coalfield.

OLD DOWN.

In an earlier number of the Proceedings of this Society, the Rev. H. H. Winwood called attention to a very remarkable section in the Rhætic formation, which occurs in a cutting on the Somerset and Dorset railway, near Lynch House.

A little farther to the west, on the turnpike road, leading from Old Down Inn to Gurney Slade, there is another exposure of the same formation which does not appear to have been noticed hitherto, although it has now been open for some years. On leaving Old Down, the turnpike passes for some distance along the top of the Rhætic without its being seen, but on nearing the Somerset

A

INFERIOR OOLITE

MOUNTAIN LIMESTONE

SOUTH

YKE

MOUNTAIN LIMESTONE.

LIASSIC

RED MARL

MOUNTAIN LIMESTONE

EAST

FIG. 1.

SECTION AT HAPSFORD VALLIS.

Scale Horizontal, 50 Feet; Vertical, 15 Feet to 1 Inch.

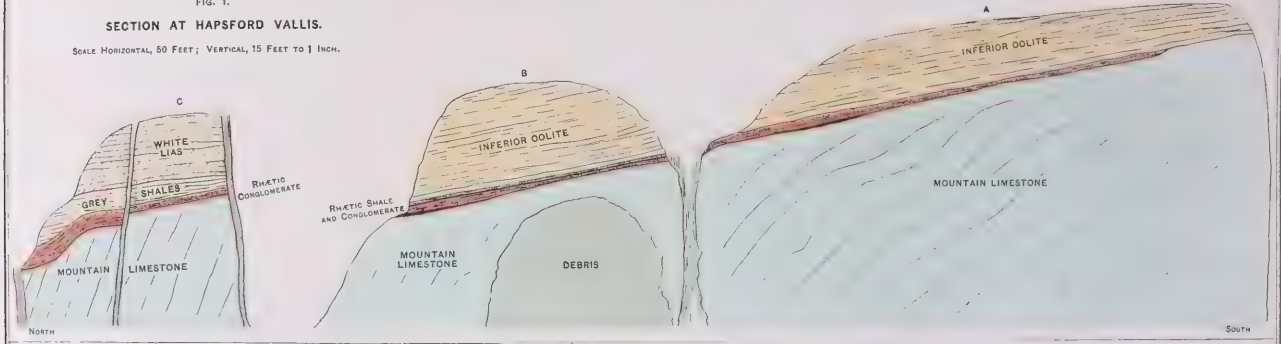
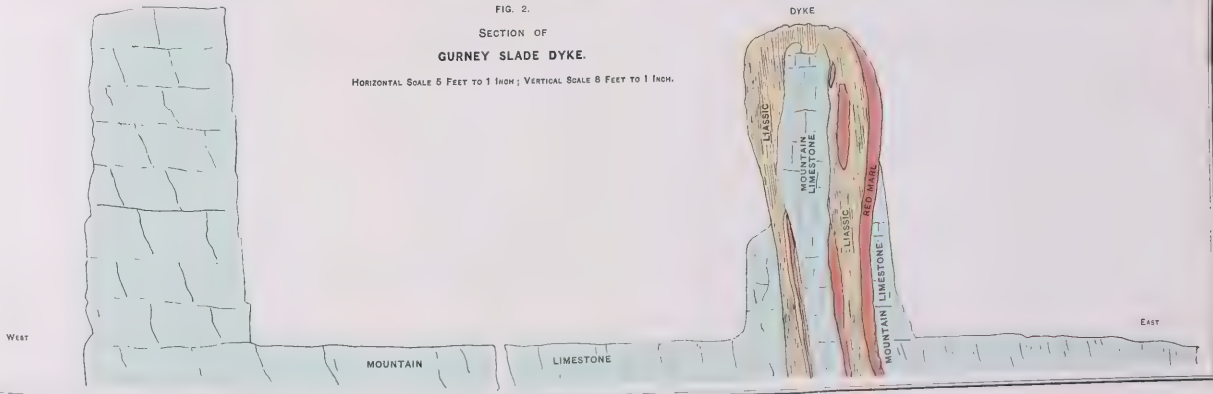


FIG. 2.

Section of

GURNEY SLADE DYKE.

Horizontal Scale 5 Feet to 1 Inch; Vertical Scale 8 Feet to 1 Inch.



W. Lewis & Son Herald Office Bath.

and Dorset railway, the road has been carried under the line by means of a cutting, which gives a useful section of the strata in that locality.

The Rhætic White Lias, the Black Marl beneath it, the Rhætic bone bed, and the Blue and Grey Marls which underlie it are all exposed, after which the road cutting passes into the Keuper Marls which are here of considerable thickness, and rest on a base of Conglomerate of the same age. If measurements had been taken when the cutting was in progress, a very complete section might have been obtained here, but as it is, the general arrangement of the beds can be clearly traced, and the bone bed, which is only a few inches in thickness, literally teems with organic remains.

The writer would advise all Geologists visiting the locality, to see this section.

GURNEY SLADE.

Proceeding onwards in the direction of Gurney Slade. the Mountain Limestone is very soon met with, and, in a large quarry before entering the village, there occurs one of the finest examples of the Liassic Dykes, which are so marked a feature in the geology of these hills. The material of the Dyke being useless for any industrial purpose, the Mountain Limestone has been quarried away on each side of it, leaving it standing like an immense natural wall which the advancing excavations of the quarry have left behind.

The top of the Dyke has weathered away a little of late years, but even now it is upwards of 20 feet in height at the highest point, and it varies in thickness from 4 to 6 feet. The Dyke consists of vertical bands of various substances, chiefly of a yellow Liassic appearance, intermixed with belts of spar, which are in marked contrast to the dark blue rocks of the Mountain Limestone by which the Dyke is surrounded; and the presence of

Liassic fossils embedded in it has led to its being generally accepted as being of Liassic age. Although late in making the discovery, however, and at the risk of running counter to accepted theories, the writer would venture to doubt whether the Dyke is exclusively Liassic, for when examining it during the past autumn, in company with the Rev. H. H. Winwood and another friend, several vertical belts of hardened Red Marl were observed, which appeared to be relics of an earlier age. It is difficult to construct an exact section of the Dyke, but the accompanying illustration will be sufficient to explain the special feature now pointed out. It gives a typical cross section of the Dyke, as it stands up gaunt and bare from the Mountain Limestone which forms the floor of the quarry, and by which it is flanked on both sides.

The north side of the Dyke is of a very decided Liassic appearance, but in the centre of the quarry, where it attains its greatest thickness, there is an included mass of Mountain Limestone, on the south side of which there occur the belts of Red Marl alluded to, alternating with belts of a Liassic character.

It is possible that, what the writer has described as Red Marl, may be the same that Mr. Moore has elsewhere referred to as Hematite, but in either case it appears to indicate that the infilling of this old Dyke belongs to at least two different periods, the one possibly of Keuper and the other of Liassic age.

In connection with this suggestion it must not be forgotten, that the principal upheaval of the Mendip hills, and the formation of most of the fissures which have subsequently been filled up by more recent strata, occurred at the close of the Coal measure period, and before the New Red Sandstone began to be deposited. The seas of the Keuper were the first which washed the base of those hills and reached to all but their higher summits, so that there is nothing contrary to reason in finding some of these chasms filled with sediment of that age, and indeed it is probable that a much larger number of these fissures than is generally supposed, received

their contents at its earlier period. There is little doubt that the veins and pockets of Hematite which abouud all over the Mendips belong to this period, having derived their ferruginous contents from the small percentage of iron which forms the colouring matter in the Keuper Marls, and has here been washed and concentrated in the veins and fissures of these hills.

It may further be remarked that the occurrence in mineral lodes of deposits belonging to different periods is by no means uncommon. In "Lyell's Elements of Geology," at page 608, some curious information will be found bearing "on the fracture, re opening and successive formation of veins, mention being made of a Lode at Gersdorff in Saxony composed of no less than 13 beds of different minerals."

In venturing therefore to suggest that the Gurney Slade Dyke probably received its earliest infilling during the Keuper period, and that when subsequently enlarged it received a further and more considerable Liassic deposit, the writer is only noticing what has been observed in other districts.

Note respecting the Winter of 1882-3. *By the* Rev. L. Blomefield, M.A., F.L.S., &c.*

(Read March 14th, 1883.*)*

The two chief features in the late winter of 1882-3 were its excessive wet and its mildness. Yet there have been winters exceeding it in both these respects, if we go back to the period of the commencement of the Bath Literary and Scientific Institution Registers. These Registers commenced in March, 1865. Omitting

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* It has been thought desirable to include this paper (which was read after the Anniversary) in this part of the "Proceedings," on account of its special reference to the winter just past.—Editor.

that year as incomplete, and taking 1866 as the first year, we have a series of seventeen years, the averages of which admit of comparison with those of the present and last year, as regards the three winter months of December, January, and February. I will first consider the rainfall. The total rainfall for the three winter months just completed amounts to 10·804 inches, being 2·110 inches above the average. This in itself has been exceeded in two previous winters; viz., in the winter of 1876-7, when the fall amounted to 12·350 inches; and in the winter of 1868-9, when it amounted to 13·388 inches. The excessive wet of the winter we have just completed drew the public attention more especially from the circumstance of its occurring at the end of a year remarkable for its persistent rainfall during the last nine months of it with the exceptions of May and September. The rainfall for April, June, July, August, October, November and December, was in each of these months considerably above the average; and in June and July more than double the average. The total for the year amounted to 42·294 inches, being not merely the largest quantity registered in any one year since the commencement of the Institution Registers, but nearly ten inches above the average of 17 years. The nearest approaches to it were the rainfalls of 1872, 1875, and 1878, in all which years the fall was more than 37 inches and a half.

Dr. Burder, the well-known observer at Clifton, has published, a statement of the rainfall there, which during the past year 1882, is said to have amounted to 44·047 inches, exceeding the Bath rainfall by 1·753 inches. I have in former instances noticed that the Clifton rainfall, as occasionally reported in the papers, exceeds that of Bath, but I am unable to assign the exact reason, the two places not being so very far apart, unless it be due to a difference of elevation.

I now pass to the question of temperature as regards the late winter. The mean temperature of the last three months, December, January, and February, was 43°·6, being 2°·4 above

the average of seventeen years. This mean winter temperature has been exceeded in two previous winters, viz., the winter of 1876-7, when it was 46°·1; and the winter of 1868-9, when it rose to 46°·3. This last was the highest mean winter temperature during the series of seventeen years; and it is worthy of note that both these very mild winters occurred after very hot summers; which accords with what I noticed formerly in Cambridgeshire, where I kept a register for a long term of years, viz., that "most of the mild winters had been preceded either by a fine though not always hot summer, or a fine autumn;" as also that three of the hottest summers that had occurred within my experience—those of 1834, 1835, and 1846—were all preceded by very mild winters, especially the summers of 1834 and 1846. But there are exceptions to this rule; and no trustworthy forecast as to the character of next summer (1883) can be made from the character of the late winter, as, though mild, its temperature was not so high as that of some previous winters, and so much depends upon rainfall and other conditions besides temperature.

Summary of Proceedings for the Year 1882-83.

Mr. President and Gentlemen,

The time has again come round when you expect a Summary of the work done during the year. If the Excursions and Walks are a fair test, then will the past year bear comparison with any preceding one; but if, on the other hand, papers offered and the audience present at their reading be taken as a test, then I fear the record will show a falling-off in this respect as compared with that of former years. This result does not follow so much from the inability or unwillingness of individuals to prepare papers for the members as from the smallness of the attendance

of the latter and their lack of interest when such matter is brought before them; thereby acting as a discouragement, and being felt as somewhat uncomplimentary by those who have taken the trouble to prepare those communications.

The Club, however, maintains its numbers and its sociability on certain occasions, as evidenced by the attendance at the Anniversary Dinners. The last one was held on Saturday, February 18th—on the eve of the regular Anniversary Meeting in the morning at the Literary and Scientific Institution—at the Grand Hotel, when Mr. SKRINE took the chair, and in proposing "Prosperity to the Club," remarked that twenty-seven years had passed since its first foundation, and thus it had more than doubled the time allotted to clubs in Bath—ten years being their appointed time, then death. What had given our Club its vitality? Might not this be attributed to what may be called its cohesiveness and its activity, that is to say the way in which the members held together and the way in which they carried on the work of the Club? Without this, decadence would speedily set in, to maintain this young blood was required. If the older members would find young men and interest them in their particular subjects of inquiry they might give the Club perpetual youth. After expressing his regret that their venerable President (the Rev. L. Blomefield) could no longer join in these gatherings, he proposed the health of the Hon. Secretaries (the Rev. H. H. Winwood and Mr. Harold Lewis) and of the Treasurer (Col. St. Aubyn) absent through ill-health.

AFTERNOON MEETINGS.

On March 15th there was a fair attendance of members to hear Dr. BIRD and Mr. SKRINE. The former led off with remarks upon "Wood's History of Bath, and the names of places mentioned in that work." Published in the year 1749, he said, it contained much interesting and curious matter. No legend or

tradition connected with Bath seems to have escaped his notice, and many illustrations of them were given, and the derivation of names of places in the neighbourhood attributed to a Gaelic origin. Mr. Skrine contested this view, as he considered these names derived from the Saxon rather than the British. In conclusion Dr. BIRD spoke of the value of the late Mr. Moore's geological collection in an educational point of view, and expressed a sincere hope that the Bath people would secure it as a monument of his genius and energy. Mr. SKRINE then gave his paper entitled "A Walk Round the Manor of Forde." The earliest account of this Manor occurred in the 10th century, and included then Warley and possibly Shockerwick. The members were taken in imagination across the two fords of the Avon and Box Brook, called then Weaver's Brook, up to Bannerdown, down to Shockerwick, Ashley Wood, round by the Tower to the Dry Arch, Conkwell, Warley ford, and round across the Wansdyke back again. Much valuable historical information was given, and the derivation of many curious names of meadows and places. Thanks were given to Mr. Skrine for his careful and interesting paper, which appears in the "Proceedings," p. 53.

This concluded the Afternoon Meetings for the spring portion of the year. The Winter Session was to have commenced on Wednesday, December 13th, by a walk round the Roman (large) Bath by Major Davis, but this gentleman failed to keep his engagement (*vide* Vol. v., No. 1, p. 33), the reason given being the inclemency of the weather. Notwithstanding this the great interest which has centred round the recent discoveries of these remarkable Roman remains brought together some forty or fifty members with their friends. The SECRETARY, in Mr. Davis's absence, rather than disappoint those who had come some distance for the purpose, did his best to act as guide on the occasion. First of all the recent finds enclosed in a glass case in the Pump Room were shown, and amongst them the egg supposed to be that of a teal, and found some 13 feet below the

surface in the north-west corner, unfortunately broken in its recent transmission to or from the British Museum. After a few general remarks on the *finds* the party were conducted to the wooden bridge erected over the end of the bath, from which the greatest portion of it could be seen, and its size, surrounding ambulatory, curious recumbent figure for the filling or emptying of the bath, and portions of roof composed of hollow tiles pointed out. Some few were found sufficiently courageous to descend to the level of the excavations, no easy matter, owing to the slushy state of the ground from the recent snowfall. Mr. Mann, the able superintendent of the works, now appeared and took the members into a room adjoining, where many objects found in such abundance during the excavations are placed for protection from the weather, and explained how the Roman arches were constructed with the hollow tiles, thus the afternoon was not entirely wasted.

The New Year opened on January 10th, with a paper by Mr. GREEN on "The Cure by Touch, with a Notice of Cases in Somerset," and was marked with his usual accuracy and power of research—Mr. Green's facts coming from the fountain source, those documents in the Record Office requiring so much patience to decipher, but which well reward the few who have the leisure and take the trouble to investigate them.

Rev. H. N. ELLACOMBE read from "Macbeth iii. 4," the dialogue between *Malcolm*, *Macduff* and the *Doctor*, referring to touching for the evil. He said he had listened to the paper with much interest, it was exactly the sort of paper they needed in that Club, it took an out-of-the-way subject and linked it in with the neighbourhood. The pamphlet was interesting because it was generally said that people came because of the coins.

He produced a Prayer book dated 1709 containing the form of healing, which on examination of the body of the book was found to be older than the title page. He was anxious to know how the form of prayer got into the Prayer book, and if it was ever

formally adopted as part thereof, how it got out of the Prayer book. Touching went on at the present time for warts.

Mr. SKRINE thought the abandonment by the English Sovereigns of the practice of touching was accounted for by the fact that the house of Brunswick did not claim the succession by divine right. King Edward the Confessor was not consecrated till 100 years after his death, did he touch, or was the power attributed to him afterwards? The power was claimed in France for Roman Catholic saints and for the heads of certain families. Charles Edward in 1845 touched a female child for the evil, who was cured in 21 days. (See Chambers's History of the Rebellion.) The Bridgwater parish registers, which the speaker had inspected, contained a record of certificates granted to persons about to be touched by his sacred majesty.

Major MENARS said that touching was as old as the human race, and they saw records of it in the Egyptian temples.

Mr. GREEN said the coin used was sometimes the gold coin of the time, the angel noble or ship angel, so-called from having the figure of a ship on it. In Holland, when Charles was poor, people brought their own money. There were some coins struck for the purpose of touching, of an inferior quality gold. The prayers existed in MS. from the time of King Henry VI. The change of season from Easter to Michaelmas was on account of the smells for fear of infection, of which there was less risk in autumn than in spring.

The afternoon of February 14th was given up to Mr. MCMURTRIE (as Mr. Sandys was unable to exhibit his Geological Specimens, owing to absence on the Continent), "Notes on Autumnal Excursions in the Mendips" being the subject, marked with the writer's usual accuracy, and illustrated by those diagrams which are a great feature in his communications. The attendance of members was very small indeed, owing partly to the steady downpour. Mr. MCMURTRIE during the afternoon expressed a wish that there were more young Geologists coming forward to

take up the study and follow the example of the late Mr. Charles Moore.

This brought the Afternoon Meetings to a close as far as the present Summary is concerned.

EXCURSIONS.

We now come to the Excursions. These have all been carried out and proved generally satisfactory in spite of the weather. The first of the season was on 25th of April to Berkeley Castle, when a good muster of the members with their friends braved the steady downpour on that day, and started by the Midland for Berkeley. The company having civilly provided a through carriage, all changes were avoided *en route*, and the somewhat moist walk shortened from two and a half to about half a mile was sufficiently long however to test the stoutness of overcoats and boots. After having first looked in at the Berkeley Arms, and made the necessary arrangements with mine host, a mass of dripping umbrellas were seen winding towards the Church, which was entered through the fine Decorated north porch. The interior presented a somewhat different appearance to what it did at a former visit of the Club; the work of restoration had been carefully carried out since then, and the character of the imposing interior well brought out. Dedicated to the Virgin Mary, it consists of a nave, chancel, two side aisles, with tower at the west end. The nave is Early English, the south aisle Decorated, and the north of somewhat later date, probably early Perpendicular, the straight lines making their appearance on the head lights of the windows. The capitals of the elegant pillars of the nave are mostly floriated, with one or two exceptions, where the nail-head ornament is used. The label terminations over the arches are chiefly heads, both male and female; but the one over the south pillar with the nail-head ornament represents a toad sitting upon the heads of two nuns. To account for this curious device the credulous are treated with

a legend of a hideous toad in a dungeon near at hand which was supposed to have been the death of two nuns immured therein, the antiquarian imagination being apt at giving a reason for most things. Some small clerestory windows pierce the south wall, but are wanting on the north side. A stone screen of Perpendicular date, on which are coats-of-arms of the Berkeley family, separates the nave from the chancel. The chancel arch, of a peculiar form, is said to be of the same date as the nave. The east window, large and broad, filled in with modern glass in memory of the great Jenner, is of Perpendicular date. On the south side is the mortuary chapel of the Berkeleys, built about the year 1450. At the east end is an altar tomb with two recumbent figures, a man in armour with a mitre at his feet (the Berkeley crest), and a woman in Court dress, date early in the seventeenth century. On the south side is another tomb with two figures in alabaster, one that of James Lord Berkeley, who died in 1463, and the other that of his grandson, Lord Thomas. The bosses in the groining of this chapel represent various subjects and scenes, both sacred and profane. Amongst the latter may be enumerated the not uncommon representation of a fox in a pulpit preaching to geese, and a mermaid with a glass and comb in her hand. Under the second arch of the south aisle is another tomb with recumbent figures of a man in armour of the fourteenth century, and a female with an extraordinary head-dress and corset, representing Thomas Lord Berkeley (d. A.D. 1360) and his second wife, Lady Catherine. An examination of the fine square Norman font, supported on four small shafts, the fine western entrance beneath the five-lighted window, and the detached tower at the north of the churchyard, from which the Church seems to have run away to its present site, was sufficient *ex more antiquo* to exhaust the energies of some of the members before lunch. Accordingly a return was made to the hostelry, and right well did Mr. Gregory maintain his reputation for good viands. Much strengthened and supported thereby, the members were enabled to proceed to the outer

gate-house of the Castle at the usual hour of opening the same to visitors. The great Hall, however, not being yet ready for inspection, the old porter seemed to have a grim pleasure in retaining the *suspects* under his eye, and a weary twenty minutes were spent in this draughty place, its only merit being the protection it afforded from the pitiless downpour outside. After some good-humoured bantering and a thorough inspection of the ivy-clad exterior of the inner gateway, and the murderous-looking square *meurtrières* over their heads, the signal was given for admission. Crossing the triangular platform with the Chinese bell on the left—trophy from one of the late wars—the main entrance to the great court of the Castle was passed, and the members entered the porch beneath a doorway composed of an arch with four plain straight sides, locally known as the Berkeley arch. Here the worthy housekeeper was in attendance to conduct the party through the portions of the Castle usually shown to visitors. Leaving the butteries on the left and turning to the right through the wooden screen, the fine hall, 61ft. long by 32ft. broad, with its open pointed roof, bore evident traces that its ancient uses were not in abeyance, and if not the scene now as formerly of revelry and feudal pomp, is certainly the very picture of aristocratic comfort. At one end is the raised dais covered with rich carpets, and a Tudor fireplace sending forth a cheerful warmth. At the other over the screen is the usual minstrel gallery. Pictures of ancestors range round the sides, and over the fireplace is a good portrait of one of the family by Gainsborough. Banners, swords, and antlers decorate the walls. Leaving this by a doorway on the right hand and passing up a short flight of broad wooden seventeenth century steps, family portraits by Sir Peter Lely and others, a couch and chair of ebony, said to have been the property of Sir Francis Drake, were pointed out, and a descent on the left hand by a modern doorway conducted to the singularly interesting chapel. On the opposite or south side as you enter is a very picturesque mural passage

opening into the chapel by four cusped arches ; on the west wall is a raised pew or gallery entered from the house and set apart for the family. The roof is of a very low pitch, divided into panels by timber ribs, and is of the Decorated style. A recent discovery of ancient black letters is of some interest. On the flat part of the sides of these beams can be traced a black-letter inscription on a white ground almost illegible, but sufficient remains to show that there are portions of the Book of Revelation translated into Norman-French by John Trevisa, a Cornishman of the fourteenth century, and once Vicar of Berkeley. These inscriptions are said to be of great historical value as being one of the earliest attempts to translate any portion of the Scriptures into a language understood by Englishmen. A low, uncomfortable-looking chair is shown here as having once belonged to Queen Anne. Passing from the chapel to the drawing-room various articles formerly belonging to Queen Elizabeth, amongst them a very fine onyx, were seen, and the deep splay of the south window indicated the thickness of the old walls. Having seen all that was permitted to be seen of the interior the members re-crossed the court-yard to the staircase leading to the keep, the most interesting part of this very interesting Castle. Turning off the stairs to the right, a narrow ledge leads to the room over the gateway, said to be the place where King Edward II. was murdered, and his bedstead, which has the suspicious look of being of much more modern date than that commonly attributed to it, almost fills up the small space. Entering the keep through a Norman portal, the room over the dungeon, where putrid carcasses were placed below to annoy the King, was the last spot of interest shown. The banner floating from Thorpe's tower (one of the four towers flanking the keep, three of which are semi-circular, while this is rectangular), indicated that his Lordship was at home. Indeed this was the rent audit day, and as the members wended their way through rain and mud to the station, his Lordship was then presiding at the tenants' dinner at the

Berkeley Arms, and a not unnatural wish was felt that the cheerful payment of the rents within might make up for the gloominess of the weather without. Thus ended the first excursion, which, if not all that could be wished, was not unpleasant.

Excursion to Seven Springs and Birdlip.—The excursion of the Club to the Seven Springs, the supposed source of the River Thames, took place on Tuesday, May 23rd, when a party of 17 members started per Midland Railway to Cheltenham, which they reached at 11.42 a.m. Here they were met by a break and drove for nearly five miles through a beautiful vale, which as you ascend the high ground of the Cotteswold Hills, looks back upon Cheltenham and the Severn Valley, bordered by the Malvern and by the Hills of South Wales. The day was a lovely warm May day, and the party had leisure to examine and sketch the source of the great English river, while a paper (*vide p.* 68) was read by the Vice-President (the Rev. Prebendary Scarth),in which he examined the opinions that had been expressed by earlier writers as to the source of the river and the origin of the name. He also gave an account of the ancient worship of streams, the remains often found at their source, both in Britain and on the Continent, but stated that no such remains had been found at the Thames head, nor yet at the head of the Tiber, of which he also gave a brief account. A single stone alone marked the rise of the Thames, and no coins are recorded to have been discovered.

Many springs rise on the basin surrounded by hills, where the seven springs take their rise, but these have been drained by the construction of the Thames and Severn Canal, into which the water of that district is now pumped, and hence has arisen the difficulty of clearly ascertaining which of the many springs has the best title to be considered the source of the great river.

As the party proceeded on the way to Birdlip, through a beautifully picturesque country, heavy thunder clouds came rolling towards them from the north, and before reaching the inn a deluging rain came on, which, notwithstanding great coats and

umbrellas penetrated through all obstacles, and the party arrived in a dripping condition at the inn. Here however they were not only refreshed, but had time to dry their coats, while the heavens once more became clear and the sun re-appeared. Their luncheon was gladdened by the arrival of the Mayor of Gloucester, who, knowing that the party desired to visit the Gloucester Water-works, had driven out, accompanied by Mr. Reed, the engineer of the works, to explain their construction. Under his guidance the party were brought to a point from whence the whole could be seen to advantage, and the nature of the stratification of the hills explained and the system of drainage understood. The party then descended the hill to the reservoirs, which form large lakes, and add not a little to the beauty of this lovely combe in which they are collected.

After having examined the Water-works the remains of the Roman villa at Witcombe were inspected, which lie in the ascent of the rising ground to the south sufficiently high to command a good view of the valley as it extends to Gloucester and the Severn having the ancient Roman road from Cirencester to Gloucester running in a direct course through it.

Two rooms of the villa having tesselated pavements, now enclosed under sheds, were examined, and the patterns noted. The decorations are composed of cubes worked into the form of fishes of different kinds, chiefly salmon, and the outer border formed into the key pattern. These floors divided into apartments, the doorways of which remain, rest upon supports, and are hollow underneath. Some of the supports have fallen, and they are therefore rendered uneven. Near them is another chamber containing the bath, and an adjoining chamber, which has also a hypocaust underneath, and the external stove for heating. Higher up are the remains of the tank which supplied the water, but the stream is now diverted.

Having returned from the villa to the carriage, which was waiting at some distance in the valley below, the party took leave

of their kind guides, the Mayor and the Engineer with many expressions of thanks, and drove to Gloucester in time for the evening train to Bath, having accomplished a very interesting day's journey, and seen much that will survive as a pleasant and instructive memory.

Excursion to Compton Martin and Cheddar Pass.—This excursion, postponed from last year, took place on the 20th June, the Secretary being absent. The Vice-President kindly informed him that he met the Club at Compton Martin, where Mr. Adlam's and his own notes were read, and some useful observations afterwards made by Mr. Browne. After this a light luncheon was provided for the members at the Rectory, where Mrs. Warren, in the absence of the Rector, kindly received the members. Directing the break to meet the members on the hill above, Mr. Scarth acted as their guide in search of the spring the source of the river Yeo. This being really covered over and conveyed through a pipe into a trough in the lane was not unnaturally overlooked. A sketch was however afterwards taken by the Vice-President of the spot where it rises. The break being met at the summit of the Mendips, the road was taken for Cheddar, and left at the top of the pass, the members walking down the same to the station. Some mistake seems to have arisen as to the necessity or otherwise for dinner, and a cold reception awaited them at the refreshment rooms. The following are the notes alluded to :—

The name was anciently written *Contone*. Here is the source of the river Yeo, called in the Perambulation of Wrington (date unknown) and in Abbot Beer's Terrier *the Wring*. The spring is above the Church, and the outlet into the sea near Wick S. Laurence. It passes through the parishes of Ubley, Blagdon, Wrington, and Congresbury. The Manor of Contone was given by William the Conqueror to Serlo de Burci, and is described in Domesday. Collinson states that the name Martin is derived from a family of eminence. The first recorded of that name is Martin of Tours, a Norman, who conquered the territory of Kemeys, in the county of Pembroke, and founded a monastery for Benedictine monks at S. Dogmael's, and annexed it as a cell to the

Abbey of Tyrone in France. His son, Robert Fitz-Martin, endowed it with lands in the time of Henry I. He also gave the church of Blagdon to the monks of Stanley, in Wilts. The descent of the Manor is traced by Collinson (see Vol. ii., p. 131, and following). It passed from the Martins to the family of Wake, from them to that of Keynes, thence to the Chandos family, and was sold by the Duke of Chandos about 1779 to the Henikers. Moreton is a tithing belonging to Compton Martin parish, and situated two miles to the north of it. It is described in Domesday. It gave name to a family which flourished for a considerable time in these parts. The Church is dedicated to S. Michael ; the tower is 70 feet high. The architecture is thus described (see Mr. Adlam's paper). For a fuller description see Som. Archæol. Journal, Vol. xix., p. 26. S. Wulfric was born in the parish of Compton Martin (see Roger of Wendover, Sub. Ann. 1154). He lived in a cell at Hazelborough, and was buried there.

The following is Mr. Adlam's paper :—

The Church is Norman, but probably built as late as the end of the twelfth century. There is no sign of there having ever been an Apse. There is a Norman Clerestory (perhaps of somewhat later date) which is unusual in Norman churches of this size and date. The chancel has a vaulted roof which is rarely found in English parish Churches, though there is one at Witham Friary, which is a Carthusian foundation, (A.D. 1175.) The chancel is Norman with good groinings, but unlike that at Witham which has an apsidal termination. The chancel arch has been enlarged, and the original mouldings and pillars cut away. This seems to have been effected when the south aisle was widened. There is an interesting and perfect monument in the north aisle. This was discovered in 1858 under the floor beneath the pews occupied by the parishioners from Morton. It bears the figure of a man habited as a civilian holding a short sword. The inscription runs "Thos. de Mortone."* I find that John de Morton held the Manor of Mortone in

* Mr. Warren was here a day or two ago, and told me that a document had been discovered at Wells ordering the erection of a monument in Compton Martin Church to ——— (I forget the name), and that it was supposed that the monument now in that Church, and which I have attributed to "Thos. de Mortone," is really the tomb mentioned in the Wells document, but that it was

demesne *temp.* King Edward II. The Thomas de Mortone commemorated by this monument was probably a son or grandson living in the time of Edward III., as the costume would seem to indicate. The organ occupies a little private chapel belonging to Bigfold or Bigfield Court, a house of the fifteenth century, about a mile from Compton Martin. The floor covers a stone to the memory of "George Roynon, gentleman, the last of the house of Bigford 1637." On the exterior the Norman windows with Transition mouldings should be noticed, and the figure heads underneath the parapet. The tower is a fine example of the same type as those of S. James, Taunton, and Bishop's Lydiard, but inferior to both these, and seems to have succeeded an earlier Norman tower. The following extract from the Registry at Lambeth throws some light upon the enlargement or building of the church tower.

From the Lambeth Register.

The will (in Latin) date 1443, of "Thomas Sambroke, of Compton Martyn."

"Body to be buried in the church of Compton Martyn.

"*Coram alta cruce* :—

"To William Rowcetre, rector of that church, and my confessor, xx*s.*

"To the fabric of the said church, *ad faciend. ibid. campanile*, xl*s.*"

When the Church was enlarged the chancel vaulting was retained, and the enlargement of the chancel arch renders the vaulting more conspicuous. The chief changes in the Church were made in the fifteenth century when the local Perpendicular style had come in. The original

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so defaced that the inscription could not be clearly made out. I saw the tomb soon after it was discovered, when it was in a perfect state of preservation, and before Mrs. Hewitt unfortunately put her painting brush upon it. Upon referring to a memorandum made at the time by myself I find the inscription is put down without question as reading "Thos. de Mortone" (a family of that name held Morton in Compton Martin, as you are no doubt aware, *temp.* Edward II., and probably for some time afterwards). I have not seen the interior of the Church for some years, I think indeed only once since the monument in question has been placed in its present position and painted and defaced. According to my recollection the man is habited in a cotehardie of about the time of Edward III.

east window must of course have been Norman, but it had been replaced by a Perpendicular window, which in its turn was removed, and the present round-headed window erected about 1852 or 1858. A screen which formerly separated the chancel has been placed as a protection to the organ chamber. The date of the screen is A.D. 1603. One of the pillars has been cut away and carved like a corkscrew. Twisted pillars, as they are commonly called, occur in other churches, but they are rare.

Having finished the reading of Mr. Adlam's paper, Mr. Scarth called upon Mr. Browne, who concurred in Mr. Adlam's remarks upon the probable date of the Church, and directed the attention of the members to the very fine and bold mouldings of the chancel groining ribs, and explained the peculiar appearance presented by the pier columns of the chancel arch having been cut away, and leaving only a few fragments on the north wall, and on the south side being supported by the fifteenth century pier of the arch of the chancel aisle. The font was also noticed, and a portion of it appeared to be of early date. The exterior of the tower presented a peculiar feature in the number of perpendicular crocketed pilasters of fifteenth century character, which appeared as if stuck on the walls without any special connection with the general design. Mr. Scarth called attention to the lower storeys of the tower, the coursed masonry of which, he suggested, bore indications of Norman work, and might have belonged to the same date as the erection of the Church, and been added to and altered when the tower was finished in its present form. Time, however, did not permit of this being thoroughly studied, but the hint may be of service for any future examination of the work.

Excursion to Manningford Bruce and Devizes.—The fourth excursion of the season took place on Tuesday, July 18th, to Manningford Bruce and Devizes. The rail was taken to Pewsey, and at Trowbridge the tedious delay which travellers on the Great Western Railway are subjected to at that cheerful station was in this instance utilised by a visit to Trowbridge Church where the

Rector and churchwarden kindly met the members and pointed out the chief objects of interest. It is a fine building of the 15th century in good repair, and evidently well cared for. The lofty piers of the nave are slender and graceful, with a rather peculiar moulding round them above the capital. The poet Crabbe,

Though Nature's sternest painter yet her best,

formerly rector, has a white marble slab to his memory on the north wall of the chancel, and in the Rectory grounds adjoining is a very old mulberry tree called Crabbe's tree, under whose friendly shade he is stated to have sat, and either here or in the Library of the Rectory written his poetry. The view of the Church and spire from the north-west corner of the churchyard, close to the nineteenth century tomb of Thomas Hellier, of riotous memory, who suffered apparently unjustly in the Factory disturbances of 1803, is very good. On returning to the station, the house where Edward Hyde, ultimately Lord Chancellor Clarendon, lived, now the County Court, was visited. Pewsey having been at last reached, a break was there in readiness to convey the party to Manningford Bruce, about two miles distant. The Rector being absent his place was admirably supplied by his daughters, who seemed to be well posted in all the details of their beautiful and most interesting Church. From their account and some notes given by the Secretary from a recent admirable paper by Dr. Baron, in the *Wiltshire Magazine*, the following peculiarities were noticed :—1. The very ancient form of the Church, consisting of an apse, a chancel and nave, in accordance with the old basilicas or halls of justice, the absence of any east window in the apse, the space having originally been filled with the representation of a "majesty" so characteristic of eastern churches, the light being admitted by two round-headed windows on the north and south side ; 2. The smallness and height of the windows above the ground level, probably for the purposes of security and obviating the draught in those days when glass was not in use ; 3. The

remarkable absence of ornamental work throughout, and the curious facing of the round-headed chancel arch on the west side, the stones of the arch being dressed apparently to represent Roman bricks with their inner ends cut to a sharp edge and dovetailing into one another, thus affording strength and at the same time lightness in appearance. During the process of restoration, so well carried out by the architect, Mr. Pearson, three consecration crosses were found on the plaster at the east end of the apse ; but these have since disappeared. The other features worthy of notice were the height and narrowness of the north and south doorways, the former now blocked up, and the herring-bone work in flint of the outside walls, especially on the west face of the nave. Rarely have the members seen a Church bearing evident marks of so early a date, and the impression left on their minds was that it must have been built at least as early as, if not before, the Norman Conquest. As to the derivation of the word Manningford, it was suggested by one of the members that the suffix "ing" indicated an Anglo-Saxon origin, and that probably the word meant the settlement of the Manni at the ford (of the river). As to Bruce, Dr. Baron thinks it derived from the family of Braose or Brewes, lords of the manor in the fourteenth century. Time relentlessly pressing, the party were obliged to pass on their way, and whilst the break conveyed those in quest of the key of the neighbouring church of Hilcot, the rest were conducted by a short cut over the fields, the ladies of the rectory acting as guides. The chief peculiarity in the recently restored Church is the position of the belfry beams, which are carried through the wall of the tower, and are seen projecting from its face as great balks of oak with a hooding of masonry over them to serve as protection from the the weather. From the string course which runs over this hooding the beams appear to be coeval with the upper portion of the tower. After a charming drive over the rolling vale of Pewsey, and through miles of corn-fields, which looked most healthy and only

wanting a few weeks' sunshine to gladden the farmers' heart, Devizes was reached about four p.m. The museum there was visited, and the remaining time spent over the admirably-arranged Stourhead collection of ancient British pottery, &c., which presents a somewhat different aspect to what it did when the Club last saw it uncared for in the vaults of Stourton. The needs of refreshment being somewhat urgent, a glance merely at the collection of local fossils was possible, and the members, after dinner at one of the hostelries, returned by 6.45 train to Bath, the day, fortunately for them, being perfect throughout.

BYE EXCURSIONS

Were fixed for Boscastle and Tintagel Mines on 6th of June, Windsor Castle July 4th, and Woodspring Priory October 10th. Of the latter only is the Secretary able to give any account. Some four or five members are reported to have gone to Boscastle and Tintagel, but whether they have returned to Bath from those distant parts record fails to show.* Windsor Castle was not visited owing to the public being excluded at the time fixed for the visit. But for Woodspring Priory and Swallow Cliff about 21 members assembled at the station and took train for Weston-super-Mare. Thence a dreary, misty ride through Worle and over the alluvial flats brought them to the Priory. After a circumambulation of the buildings through wet orchard grass, a muster was made in the Refectory. Here a concise and clearly written paper, with a plan of the structure by Mr. R. W. Paul, was read by Mr. J. Allon Tucker; the chief point seemed to be that the so-called Refectory was not the Refectory but the hall. Some remarks were made by the Vice-President (the Rev. Preb. Scarth)

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* Since writing the above the Secretary has received an admirable account of this excursion from General Brooke, together with pen-and-ink sketches in illustration. *Vide p.* 138.

as to the state of the present Priory when compared with the ruins of Cleeve Abbey, to the disadvantage of the former, and a wish was expressed that the owners of the Priory would treat it with more reverent care than they had done. The paper was ordered to be printed in the "Proceedings" (*vide p.* 75). Some members were left photographing and sketching, while the rest walked to the end of Swallow Cliff, where the view was remarkable by its absence, a regular damp sheet being spread around. The Secretary made some remarks on the geology of the neighbourhood, with a geological map spread out on the rocks. He stated that they were standing on the north-west edge of the Coal basin and in the presence of a "raised beach" on the south side of the promontory, about 20ft. above the sea level. The return was made along the cliff under umbrellas, the thoughts of what they might have seen being rather consoling. A distant peep down at the pebbly beach on the north, where ran the igneous reef, was all that the long wet grass permitted. After the usual wandering off of members along the sandy bay, with good intentions of meeting the break at Kew Stoke Lodge, which they never did, the members returned by the 4.5 train to Bath.

Iron Acton.—One more bye Excursion was arranged on 29th August for Iron Acton at the invitation of the Rector, and notwithstanding the deluge of rain in the early morning the day proved very fine and enjoyable. The Rector's carriage had been thoughtfully sent to the Yate Station to convey the aged and infirm, two or three of whom took advantage of it. The rest traversed the short distance on foot, and found those who had preceded them resting under the shadow of the churchyard cross. It was evident that this was no ordinary cross. Mr. Pooley in his notes on Gloucestershire crosses considers it unique as a "Preaching cross," but there are others who find a difficulty in considering it to be one of that class. It is placed on the north side of the Church, consists of two stages, is raised on three steps, which are of rather unusual height, and the lower stage is enclosed with

three arches; the fourth side, on the south, is open, apparently to admit the preacher, but originally a central shaft existed, and consequently after the preacher had with some difficulty, especially if he had short legs, mounted his rostrum, he would have found still greater difficulty in preventing himself from colliding unpleasantly with the central shaft, especially if in the midst of a florid address he forgot his surroundings for a moment. But if not a preaching cross, what was it? The beauty of its design was indisputable. The eight shields which surround the basement of the top tier were explained by the Rector—four have emblems of the Passion carved in relief, two are blank, two (one on the north and one on the south side) are armorial, with the arms of the Lord of the Manor and his wife at the period of the erection of the cross, *temp.* Henry VI. Entering the Church by the north porce, a portion of Transition work in the doorway was pointed out as the only remnant of early work in the Church. The chief interest inside is centred in the monuments of the Poyntz family, who from very early times held the Manor of Iron Acton. Mr. Thompson, the rector, in an elaborate paper in the Proceedings of the Gloucestershire Society on the Poyntz family, writes that the Manor came into the possession of the Actons soon after the Norman Conquest, and descended through several generations to Sir John Acton, who died without issue in 1344. His estate then passed to his cousin Maud, the second wife of Sir Nicholas Poyntz. This latter family then held the Manor from 1344 till the death of Sir John Poyntz, 1680. The three slabs in the Church, marking the graves of Sir Robert Poyntz, who died 1439, and of his two wives, were shown. It was this Poyntz the Rector considered to be the builder of the fair cross. Round his slab was an inscription stating that "thys stepyl (he) here maked." The question was, could the word steeple be applied to the cross, or was it applicable only to the tower? The latter being the generally accepted view, a very moot point now arose, could any portion of the tower be put down to that date? Rector, architect,

and laymen all had their say, and after a lengthy discussion on a tombstone outside, the general opinion was that the top storey was of very late date, but that the lower stages were 15th century work, and that Robert Poyntz may have built it. An ascent of the tower was made, whence was a lovely view of the surrounding country. After lunch, kindly provided at the Rectory, Acton Court the former residence of the Actons, was visited, the peculiar feature of which is the fine oak newel staircase. During the day the origin of the words Iron Acton was discussed, and there seemed to be very little doubt that the family derived their name from the place, and not the name of the place from the family, the word Acton signifying the town of the oak tree, from the Saxon Ac, an oak. The word iron, of course, was easily accounted for. After thanking the Rector and his lady for their courteous hospitality, a short walk through the Rectory grounds conducted the members to the train.

WALKS.

The extremely wet season has very much hindered the members from their usual walks; several however have been organised by Mr. Herdman, who has sent to the Secretary a short record of them. One arranged by Mr. Skrine round the Manor of Forde was very successful, and took place on the 9th May. The object was to illustrate his paper read to the Club on the 15th March, 1882, and the following notes have been kindly supplied by Mr. Skrine :—

Excursion Round the Manor of Forde.—The Club met by invitation at Bathford Bridge on Tuesday, May 9th, 1882, to take this walk under the guidance of Mr. Skrine. It was a lovely day, and the air fresh and the party was numerous. The inscription on the bridge was noticed, and the Quakers' Burial Ground in the Paradise Close, for which name a suggestive origin had been given in the paper recently read to the Club. The members then proceeded up the pleasant lane which is here the boundary of the Manor, formerly called

the Street, or Foss Way, and now called "Morris Lane," and at its upper end emerged on the Bannerdown Road and sought for the "One Stone" named in the Saxon Land Limits. There was an ancient stone marking the parish bounds on the right hand of the road, but its bulk hardly conveyed the idea of its having been the original stone. The ancient survey, no doubt, as well as that of 1605, must have gone higher up than this point—as the one goes to Bannerdown and the other to Briton's Land under Bannerdown—but the turnpike road to Cirencester by greatly widening the ancient Fosse Road has cut off the line of communication at all events in the memory of man; and this part of the waste seems to have got somehow included in Shockerwick or Batheaston. The bounds which we were able to show culminated a short way above the "One Stone," in a field called Baw Combe, or Beo Combe; no doubt the original was *Beonnan Leaze*, or the Bee Meadows, for the position is most sheltered and sunny, and so near the down as to supply the bees with ample sweet pasture in the days of yore. Leaving this field on the left-hand the Club followed their guide down the lane towards Shockerwick, which is here the boundary line. Nothing remarkable beyond the pleasant view from the winding lane met the eye, but there seemed some extensive building work going on in the lower part of the Combe in connection, as it would appear, with market gardening. Richard Pierce's house, like the St. Giles's Chapel, could not be identified, but we fixed the place where these should have been; and now as the road no longer served as a guide we had to get over a gate and bear away towards Shockerwick Lodge. On leaving the land of Mr. Wiltshire, of Shockerwick, we scrambled through the boundary hedge over uplifted roots of elm trees, levelled by the gale of April 29th, into "Lunterwells," a very pleasant green meadow belonging to Capt. Sainsbury, who now acted as guide, and drew attention to a splendid spring of never-failing water welling out under the upper hedge. But why called "Lunterwells?" Part of this field prior to 1792 was called "Matford." We next crossed the Box high road, and by a stile entered Long Ivies (erst Nivey's Pye), a long strip of meadow, here divided by hedges, which extends along the banks of the Weaver. By a bridge over the brook and an arch under the railway we came to a field with a little brook gurgling down by the side of a hedge on the east, and this was the King's Hill (or Kinsells' as now pronounced) Brook, by the side of which we had a

pleasant climb towards the Ashley Wood, just below which is the Boggy Meadow, the Hnœs-leigh of the Saxon Survey. And now we came on the new slide by which the Farley Down quarrymasters send their stone to Box Station, which slide now forms the boundary. It was with some wistful feelings that we watched the tram-cars going up empty, when we contemplated the long steep white incline before us, but the walk was much lightened by the pleasure of picking the wild flowers that skirted the woods on each side. After a pretty stiff climb, as it is "a long lane that has no turning," we found a pathway crossing our line to the east, and affording a very gradual ascent to the top of the hill. This Captain Sainsbury assured us must have been the line of the ancient Roman Road from Bath to Marlborough, which certainly must have come near this way, and as the path was evidently a paved one originally the conjecture appears nearly certain. Sir Richard Colt Hoare could only find slight traces of the road, but covered as the side of the hill was with thick brushwood it is not unlikely that archæologists, strangers to the district, might not easily have found it. Near to the spot where this path emerges on the Farley Down are two very singular bowl-shaped hollows of considerable size; these are on opposite sides of the path, one is in Wilts and the other in Somerset. Their name "shamble-pits" indicates their use in former times, and recalls the sports of our forefathers, bull or bear baiting having then delighted the rustic mind. May not these pits be suggestive of sports of still greater antiquity, and be a tradition of those of the amphitheatres of the Romans?

As we came out on the hill above the wood Captain Sainsbury informed us that in a neighbouring recess of the wood he had provided a slight collation in the shape of sandwiches, bread and cheese, and refreshing drinks, which kind thought was highly appreciated by the party, who were glad not only of a halt but of some shelter from the fresh breeze, which at this exposed point of the hill was something more than fresh, if it might not be called a "nipping and an eager air." After this much-needed rest the Club proceeded along the top of the Bathford hill, noticing the fine view to the west over the blue hills of Wales, and to the north the line of demarcation, as laid down by Dr. Guest, between the Saxon and British kingdoms after the Battle of Dyrham. The opposite hills of Bannerdown and Kingsdown, with the valley of the Weaver between, forming the

boundary. The walk hence, along the springy sheep pasture on the ridge of the hill was pleasant enough, and in about half a mile we reached the Bradford road, near the Dry Arch, where Mr. Skrine pointed out the spot where the Bathford Revels used to be held, and passing under the Arch and through the gate of Warley House Wood, we reached the spot where a more substantial luncheon was awaiting the Club in a grotto built out of the stones of the old keeper's lodge, who had been the master of the revels. In front were the walls of a rustic fort built to commemorate the bombardment of old Claverton House from this side of the valley, with a description of which incident of local history Mr. Skrine entertained his guests. After the meal was finished a lively discussion ensued, and the Club separated for the walk to their several homes in friendly groups; and it is hoped not without a determination to finish the round on some future occasion.

South Wraxall, Tuesday, 7th February.—Taking the Great Western train as far as Bathampton, the members walked by the Devizes road up to Kingsdown, and thence to the village of South Wraxall. A fee of sixpence each admitted them to the old Manor house, a good specimen of mediæval domestic architecture. The buildings surround three sides of a court, with a gatehouse to the south and a hall facing the west. The oriel window is of the time of Henry VII.. A pleasant walk on their return through the demesne of Sir Charles Hobhouse brought them to Monkton Farley. After luncheon they walked down the hill to Bathampton.

Great Charfield, Tuesday, 7th March. — The train was taken to Bradford, thence a pleasant three miles walk to Great Charfield, to see the remains of a fine mansion house of the 15th century. It was built by Thomas Tropenel, who died in 1490, and with Agnes, his wife, is buried under a rich altar tomb in Corsham Church. The oriel window is of singular beauty. A little Church close to the house has a curious bell turret of the time of Henry VII. The water of the moat turns a mill, which occupies the site of one that existed here during the time of the Domesday Survey. Walked back by Bathampton.

Savernake, Tuesday, 14th May.—The Great Western train was taken to Devizes and Savernake. After lunch there at the comfortable hote built by the Marquis of Ailesbury, the members walked through the magnificent forest to the interesting town of Marlborough. The avenue

of gigantic beech trees is four miles long, and some of the oak trees are of great antiquity. After a most agreeable day Marlborough was left by train to Swindon and Bath.

It may be well here to remind the members that there is an album for the purpose of receiving contributions in pen, pencil, or sunlight, of objects of archæological, geological, or botanical interest connected with the locality. Contributions to this have been made during the year by Mr. Powell from photographs taken by himself during the excursions of the Club. Amongst them, three views of Woodspring Priory, taken certainly under difficulties, owing to the misty rain which interfered so much with the pleasure of the excursion on that day, and another of an inscription on a stone built into the porch of Semington Church, near Trowbridge, and supposed to be a French "Pater Noster."

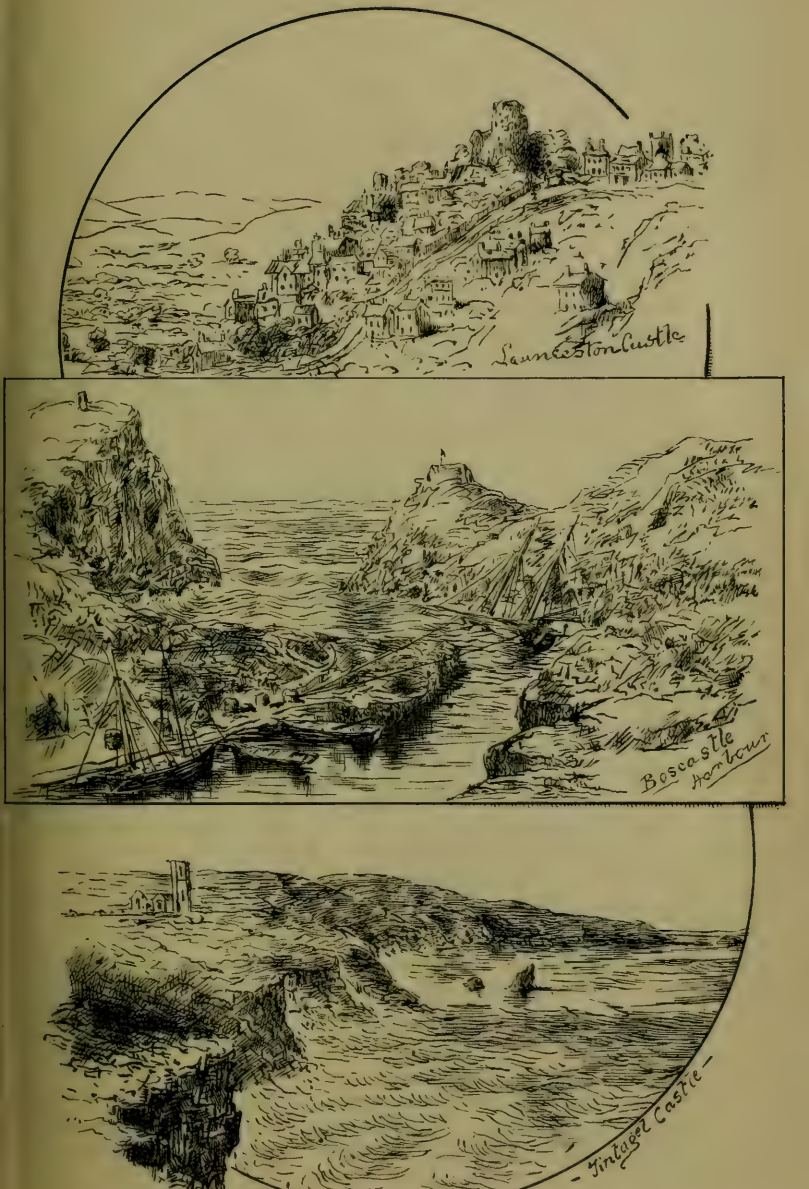
In conclusion we may congratulate ourselves on our financial condition, the total receipts for the year being £78 8s. 5d., and the expenditure £42 11s. 8d., leaving a balance of £35 16s. 9d. in favour of the Club. This is greatly due to the careful superintendence of that branch by our late Treasurer, Colonel St. Aubyn. His genial presence we now miss from our meetings, owing to absence from England, but his mantle has fallen upon Colonel Chandler, likely to prove a worthy successor in that office. Our numbers, too, though thinned somewhat, maintain their equilibrium. Death has again been busy in our ranks. Two familiar faces have disappeared from our midst, both valuable members in their way. Mr. Biggs, carried off in the midst of a vigorous, active, and usefully scientific life; Mr. Kerrison Harvey, doing his utmost, and perhaps sometimes even overtaxing his strength, to support by his cheery presence our weekly walks and afternoon meetings.

H. H. WINWOOD,

Hon. Sec.

Excursion to Boscastle, Tintagel, &c.—Early in the month of June, 1882, the Bath Field Club visited Boscastle and Tintagel, situated on the wild and rock-bound western coast of Cornwall. There are several places of interest on this coast, the romantic beauty of which is not a little enhanced by their out-of-the-way situation, and by the difficulty experienced in reaching them. The whole coast opposes a lofty and bluff wall of dark rock to the great billows of the Atlantic Ocean, which within historical memory has been able to make but a faint impression on this adamantine barrier. Between close projecting headlands, there are a few open coves, where a little sand has been washed up, and which, one cannot say give shelter, but which furnish a few yards of beach, enabling the Cornish fishermen in very calm weather to launch a boat or two, which on their return they have to haul high up on the steep slope, often by the aid of a windlass or even a crane; so as to place their little craft out of the reach of the huge rollers, which rapidly succeeding disturbances are certain quickly to bring.

The precipitous coast is generally 300 to 500 feet high, in a few places attaining to 700 feet. The general level of the land rises from the cliffs to the plateaus of Davidstow Moor, Bodmin Moor and other Downs, which form the backbone of Cornwall. These are of the same Geological formation as Dartmoor Forest to the east in Devonshire. The Cornish Downs and Dartmoor Forest have been separated by a dip in the land and the erosive action of the river Tamar and its tributaries, the Tavey, &c. These have made courses for themselves from north to south, through the hard slaty and granitic rocks of which both plateaux consist. The principal towns in this part of Cornwall are situated in these valleys, through which the railway routes tortuously meander, but do not approach the Cornish plateau nearer than Launceston, where the members of the Field Club left the railway. There is little left of the ancient Priory of St. Stephen's at Launceston or of the ancient city walls. The ruins of the keep of the old castle still exist. *(See Illustration Launceston Castle).* This is one of very oldest fortifications in England, dating possibly from before the Norman Conquest, and mentioned in Domesday Book in 1086. The gates are in good preservation, especially the south and east gates. The keep is a grand and picturesque ruin, though the lower part of it has been *nicely* (!) smoothed and turfed. It stands on the summit of a steep hill, dominating over a large expanse of rich valley and distant down,


Launceston Castle
Boscastle Harbour
Tintagel Castle
W. LEWIS & SON. BATH.

NATURAL HISTORY

and apparently disdainfully frowning on the new and primly neat specimens of modern residential architecture, which are rapidly shutting it in. Coaches and carriages are always procurable at Launceston for the journey to Boscastle *vid* Camelford. A few miles after leaving Launceston, Brey Down is passed to the left, and the road crosses the summit of Davidstow Moor. The smooth and level uplands of this high table-land are swept almost continuously by the prevailing boisterous south-west winds, and no tree or bush can stand against the occasionally terrific gusts—but when crossing the moor on a fine summer's afternoon, as we did, its bare, wild undulations receive the shadows of passing clouds, reminding one of the soft gentle tints of the Roman Campagna, whilst the shimmer of the not too distant Atlantic adds brightness and variety to the lovely scene. The summit of the moor is 1,100 feet above the sea, and here is a cottage, said to be the highest inhabited house in England, the tenants of which from the exposed bleak situation must lead a wretched and precarious existence. Wherever the fall of the land affords protection from storms, a few scant crops are grown ; whilst the bottoms of the valleys, though very narrow, are richer, and partially wooded. After leaving the moor, Camelford is reached ; and thence the road to Boscastle, descending gradually, winds for the last three miles amongst richly-wooded and cultivated dells, reminding one of some of the Welsh or Scotch valleys. Boscastle is at a turn of the road just as the valley opens out to the ocean, and exposes the surface of its hilly sides to the Atlantic blasts, where all vegetation excepting grass ceases. In this opening is the harbour, formed in the estuary of the little Valency river that we have been following. We first come to a small inner basin lined with quays. This is about 40 yards across, and long enough for 15 or 20 fishing boats to lie in. The basin is entered from the sea by a deep and narrow channel winding in an S shape through dark slaty rocks. Outside the channel is the outer harbour, if harbour it can be called, being merely a narrow bay, open to the ocean, where the waves roll in and rebound in foam from off the precipitous headlands, which in case of the southern one rises to a height of 600 feet, and confines the raging billows within its cavernous bosom. The smallness of the entrance, the difficulty of hitting it on such a stormy coast, and the sudden turn of the channel so close to the entrance, prevent vessels of any size visiting Boscastle. Even to ensure the safety of the small vessels that arrive, a

curious provision is made to protect them from the dangers of the narrow channel. A number of short stout posts some two feet in diameter, and only two or three yards from each other, are firmly fixed in the ground on the southern side of the harbour near its sea end. Thick cables are passed to any vessel entering in rough weather, and worked round these posts successively to prevent the vessel being dashed by the waves against the northern shore of the channel on to which they roll their great masses. It is a curious sight to see a vessel thus warped in. *(See Illustration Boscastle Harbour).* Forrabury is the real name of the Boscastle village, the latter name referring merely to the ancient Castle of Bottreaux, which has now only a few ruinous rooms to mark its former importance. The church at Forrabury is in the early Perpendicular style. A granite cross at the foot of the rise, on which the Church stands, as well as the font, are said to be ancient. The chancel screen and pulpit are also old, but more modern and worth noticing. The walk along the cliffs *vid* Trevalga and Bossiney to Travenna was most interesting. The exhilarating effects of the fresh sea breeze tempt one to loiter on the summits of the cliffs, and to listen to the waves dashing with booming sound into the caverns below, which here and there have been hollowed to a depth of hundreds of feet by their incessant action ; and in which numerous seals disport themselves, as well as on the frequent rocky islets, and are occasionally caught by the fishermen. The pretty Church at Trevalga with its curious old fresco paintings was visited by the Club. Another of the ancient crosses, and a very remarkable one, was also here observed, but no one could give any explanation regarding it. It appeared to be of the same greenish grey rock as the stone lying in the roadway, and called King Arthur's Quoit, which that potentate is supposed to have thrown from Tintagel Castle, about two and a half or three miles away. The "Quoit" is about four feet in diameter and a foot thick, and appears to have been a nether millstone, in which a beam had been worked round and round perpendicularly by a horse or bullock, till the centre had been worn through, thus giving the semblance of a quoit. Mills of this nature are universally used in the east to this day for pressing oil seeds. A visit to Knighton's Kieve diversified the walk. This is a picturesque waterfall of about 40 feet high, but with no great body of water, its interest consisting in the wild beauty of falling water set in a casket of luxuriant golden ferns

and mossy wet rock. Beyond the scenery there is nothing of interest at Knighton's Kieve. Passing Bossiney we arrive at Travenna which stands on the lofty bare down. The Church, dedicated to St. Marcelliana, is cruciform in shape, and has been recently restored and beautified. The tower of the Church is unnecessarily lofty and wants breadth at the base for such a position, where even the very tombstones have to be supported by masonry buttresses. The Church is said to contain several objects of note, but we could not spare time to examine them, as we were averse to being drawn away by objects of inferior interest from the far greater pleasure we anticipated from the visit to King Arthur's famed fortress and birthplace—Tintagel Castle. *(See Illustration Tintagel Castle).* Tintagel is one of those strongholds formed by nature, like the great rock fortresses in India. A bold headland, with a broad and flat top whose surface is a continuation of the plateau of the inland Down, on which the Travenna Church stands, projects boldly into the sea. It forms almost an island, and has lofty perpendicular sides, rising (excepting on one short side) sheer out of the dark blue sea. The surface of the plateau thus cut off has a superficies of no less than 15 acres. It is separated from the rest of the promontory by a fault in the rock, which leaves a very narrow sharp neck, some 40 or 50 feet only above high water mark. The promontory inland from this neck rises gradually but steeply, and only widens when it reaches the plateau at some distance from the fortress. The only entry into the great fortress is by a winding stair, cut in the precipitous rock, and starting from the narrow neck to a gateway in a battlemented wall above. On reaching the gateway, which does not appear very ancient, though the original entrance must have been of necessity in the same situation, we first step on to a terraced plateau to the north-east of, and 60 or 70 feet lower than, the great upper plateau. This terrace is about 70 yards in breadth and 150 to 200 yards long, and it provided a spot well sheltered from the Atlantic gales, for the erection of the Royal Palace, Church and other buildings, the ruins of which are all that remain of its former greatness. After advancing along the whole length of the lower plateau, which gradually rises and narrows, we find ourselves at last almost on a level with the great upper plateau, on which a few steps up a cliff path lands us. Very few remains of any kind exist here. There are two entrances to subterranean vaults, which are almost filled with earth,

and there is also a spring of water. Some remains might be found were the ground cleared, though probably they would only be of granaries and guard-rooms, as the more important residences must have been on the lower plateau. The fortifications were necessary round the upper plateau, as the cliffs are everywhere quite perpendicular, and in places even overhanging. The commanding position of the fortress, the grandeur of the view, and the historical associations surrounding it, cannot fail to impress the mind with a feeling of pleasure at seeing a spot where the past is brought so much nearer to us, and of awe at the transitory nature of everything human. On the northern side of the fortress is a small sandy cove, and a crane for hauling up boats, as it is only at low water that the sand is visible. At high water the cove becomes open sea. The foundations of what is supposed to have been a drawbridge are shown. This is said to have joined the fortress to the mainland, but this is of course a fable, a drawbridge being quite unnecessary, and it would only have been a source of weakness. On the neck of the promontory towards the downs, after it has risen almost to the level of the fortress, there are remains of buildings supposed to have been included in the fortress. They were probably outworks and the residences of the nobles or knights attending the Court. In the same way the Gothic archway at the Vicarage of Travenna and the rectangular fishponds there are said to have been included in the fort. They are more than one mile distant and have nothing to do with it, and may have belonged to some convent or monastery in after times. Tintagel Castle was not abandoned on King Arthur's death, but appears to have been regularly used at least up to the time of Richard II., as the Earl of Warwick was imprisoned there for two years. How much longer it was used, or when abandoned, does not appear.

With the return of the Field Club from Tintagel, the excursion which had been amost delightful one to all who joined it, closed, and the members returned to Bath.

Julian F.
29.7.82.

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1884.

On Fungi found in the neighbourhood of Bath. *By* C. E. Broome, Esq., F.L.S.

(Read March 14th, 1883.)

The last notice of the Fungi of this district was read before the Bath Field Club in March, 1879, and it brought the subject to the end of Berkeley's 22nd Order, the Trichodermacei, and we have now arrived at the Fifth Family, the Ascomycetes, which has been generally regarded as a natural division of Fungi, and derives its name from the fruit being developed in little sacs or asci. The investigations of recent botanists have however shown that other forms of fructification occur in the same species, so that the term Ascomycetes is not strictly correct; at least in several of the genera and species, those namely in which more than one form of fruit has been discovered. The number of such species is still very limited, so that the present arrangement had better be continued provisionally; otherwise a fresh distribution will have to be made again and again, as fresh forms of fruiting occur, which is very undesirable.

Having hitherto followed Mr. Berkeley's classification in his Outlines of British Fungology, I shall now quote what he says in his Cryptogamic Botany in connection with the present branch of our subject.

To begin with the highest Order. The Elvellacei. Here the hymenium or fructifying surface is open from the beginning, or rarely closed; the substance is fleshy, and waxy, or tremelloid, rarely subcoriaceous; and, in form, cup-shaped or clavate. The grand characteristic of this group of Fungi is the fleshy or soft texture, and the more or less early and complete exposure of the surface of the hymenium. In the more perfect genera there is in no stage of growth any tendency to form a cup; but even these are so intimately allied with the more noble Peziza, that it is a matter of some difficulty to distinguish certain states of Peziza macropus, for instance, and Helvella elastica.

The sporidia in the Ascomycetes vary much in form, and sometimes approach in appearance those of such truffles as Genea; and there are some species of Peziæ which are essentially subterraneous in their mode of growth, as Peziza sepulta, which has been found in Suffolk by Dr. Badham. The large genus Peziza embraces many of the most elegant fungi, from the little white and yellow P. calycina, which is very common on twigs of fir, to the gorgeous P. coccinea, which attracts the notice even of children, in our banks and hedges growing on sticks partly buried in the soil, and frequently set off by a surrounding of vivid, green moss. The bright orange P. aurantia, growing on the bare earth, and the elegant P. macropus, conspicuous by its long and slender stem, and the font-shaped P. acetabulum, which might form an appropriate pattern for the sculptor or silversmith, are well worthy of our attention. In Helvella the cup is inverted, so as to form a mitre-shaped or ovate pileus, with the margin free in some species, but in others more or less perfectly attached to the stem. When the cup and stem are perfectly soldered together we have the clavate species of the group. In Spathulea the stem is still visible on one side through the greater part of the pileus, and the consequence is that the hymenium assumes a spathulate form, or that of a battledore.

In Mitrula and Leotia we have distinct stems with a subglobose head more or less intimately connected with it. In other cases the stem is so confluent that we have forms, as in Geoglossum difforme, not distinguishable from those of the Hymenomycetes, except by their mode of fructification. Still another form or two are produced by the multiplication of the hymenial surface through inequalities which were first shadowed out in Peziza venosa; and those in the common Morel which are increased to such an extent as to represent deep pits like those of a honeycomb. There is a lower series where the cup is obliterated by expansion, the attenuation of the margin and the flattening of the hymenial surface. Such forms are represented by Propolis and Cryptomyces.

A few of the Peziæ not only lose entirely their cup-like form, but become confluent, as in the case of P. confluens, which thus produces a nearly uniform stratum, distinguishable from similar Hymenomycetes, as Corticium, only by the fruit. The Peziæ occur chiefly on decaying vegetable matter or on dead sticks, but the larger kinds mostly grow on the earth.

Out of more than 900 described species, British and exotic, many of which are probably the same species, quoted under different names by various authors, we claim about 108 for our district, of which we owe a good many very interesting kinds to my friend, Mr. Bucknall, of Clifton, a very zealous and accurate mycologist, who is now publishing the result of his researches in the Proceedings of the Bristol Naturalists' Society.

In the classification of so large a group as is constituted by the Family Ascomycetes, and especially in the Genus Peziza, many difficulties must necessarily occur, and the different organs they possess have been seized on by mycologists as presenting characters sufficient to separate the members of it into genera and sub-genera, some authors selecting one particular organ as most distinctive, some another, but these systems have generally failed to constitute truly natural divisions, and one is often compelled to fall back on Fries's arrangement as most true to nature. If, for instance, an author constitutes his chief character on the divisions of the fruit, as to its being continuous, or once, or several times septate, he is soon landed in difficulties by finding fruit, in this respect alike, occurring in species far removed from one another in natural affinity. And as each writer takes perhaps one particular character for his leading notion and founds his genera upon it, while another selects another point of resemblance as the most important, the result is that the system is overloaded with heaps of genera, many of which are founded on insufficient grounds, to the great discouragement of students, and the unnecessary complication of the subject. As an instance, Fückel makes a genus of Peziæ out of certain species characterised, as

he says, by having asci obliquely folded, or plicate, and therefore called Plicaria; among them he places Peziza trachycarpa *Curtis*, a species which I have found in great plenty, and of which I can assert that no such character exists, and I can affirm the same of several others of the set. Now when a student working by Fückel's book alights upon one of these species he sees a character "asci toti oblique transverse plicati," and finding the asci really quite smooth, he is of course altogether thrown out. And how often this may happen is shown by the fact that he has constituted in his Symbolæ mycologicæ 28 genera out of the single Genus Peziza as defined by Fries. Later writers have carried this system to a still greater extent.

M. Boudier observes that in certain sections of Ascomycetes the asci open by lids, in others by slits, in others by a mere rupture. The first he calls operculate Discomycetes, the others inoperculate. The operculate Discomycetes, he says, have simple sporidia, *i.e.*, without septa. In this he includes the Morels, the Helvellas, the Verpas and certain sections of Pezizæ, as Aleuria, Humaria, many of the Lachneæ, Ascobolus and the greater part of the genera which are derived from these sections.

The second or inoperculate division is clearly separated from the first by the absence of a transverse or oblique slit at the extremity of the ascus, which bursts by the tension of the fruit as it becomes mature, the end of the ascus then often bending down like a collar, as in Peziza tuberosa, P. rapulum, P. echinophila. In this section the species have frequently sporidia, with a tendency to division, or are clearly septate, or may even become so at the time of germination. There are other characteristics of these inoperculatæ in which section he includes Geoglossum, Mitrula, Leotia, Phialea, Helotium, Lachnella, Mollisia, and the genera belonging to them. M. Boudier thinks these observations of great use in the natural classification of this difficult family, but he observes that there are many species which require to be withdrawn from their present generical position among the oper-

culatæ and to be transferred to the second or inoperculate division. It is necessary to examine species when fresh to ascertain their true position, as the delicate membranes shrivel up and do not recover their natural condition when moistened. Nor can a character be of much value which brings together such aberrant forms as some of those above mentioned. All such minutiæ are of great value as characterising species, but their use as sectional divisions commonly proves delusive.

A far more degenerate form of Ascomycetes, consisting of little more than asci, accompanied by very short, moniliform threads, occurs on leaves, causing them to swell and blister, as in the peach, walnut and pear. This is the genus Ascomycetes, one of the most obscure among fungi, but from its effect on vegetation, of considerable importance. Tulasne has shown that there is a second form of fruit in some genera, as for example in Bulgaria, where the species sarcoides, in its early or conidiiferous state, is known as Tremella sarcoides, but in its more advanced or asciger-ous period it is recognised as Bulgaria sarcoides. We have a similar case in Fusarium tremelloides, which forms little red, gelatinous masses on dead nettle stems, but in its more perfect condition constitutes Peziza fusarioides. Coryne virescens *Tul* has naked fruit situated on sporophores, but later on an ascigerous form is developed from the same matrix, and it then becomes Peziza atro-virens *P.* Tulasne has also observed a third form of fruit in certain species, which he calls spermatia.

The elastic force with which many of the larger Peziæ and Helvellæ eject their sporidia is very remarkable and has often attracted attention. This peculiarity may easily be seen in the larger Peziæ, such as P. vesiculosa, common on hotbeds, and P. reticulata, which appears in the spring in meadows and grassy banks. If either of these, when mature, is placed in a box for a short time and the box then suddenly opened, a cloud of dust-like sporidia may be seen to arise from the hymenium and disperse itself in the air. These sporidia are so minute that they may be

carried for miles in the wind, and thus the appearance of Fungi in places previously void of them is easily accounted for. A few of the species of this group afford excellent articles of food.

Morels are found in some parts of England in sufficient numbers to supply a great deal of food and katsup and are highly valued by French cooks for flavouring soups and made dishes. In Germany they were observed to grow particularly where wood had been burned, and the collection was so lucrative as to induce the peasantry to destroy the forests by fire, a practice which was at last stopped by the enacting of special laws. One or two species of Helvella, especially H. esculenta, are considered excellent food. H. crispa confers a fine flavour on soups, but I have been unable to render it tender by cooking.

The above remarks may give some faint notion of the appearance and qualities of the section of Fungi to which the present notice is devoted, and may be the means of inducing those who have leisure, or want amusement, to give a portion of their time to the study, and may add interest to the dullest country walk, and increase their stock of health by furnishing a motive for active exertion.

FAMILY V. ASCOMYCETES.*

Fruit consisting of sporidia, mostly definite, contained in asci, springing from a naked or enclosed stratum of fructifying cells, and forming an hymenium or nucleus.

ORDER 23. ELVELLACEI.†

Hymenium at length more or less exposed. Substance, soft.

GENUS 257. MORCHELLA.‡ *Dill.*

Receptacle clavate or pilcate, impervious in the centre, stipitate, covered with the hymenium, which is deeply folded and pitted.

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* From ascos a vessel, and muke a fungus.

† From Helvella, one of the genera belonging to the Order.

‡ From Morchel, the German name.

Morchella crassipes *P.* Brockley Combe, May, 1879. C. Bucknall. Fungi of the Bristol district. In the Proceedings of the Bristol Naturalists' Society. Vol. iii., p. 7.

Morchella esculenta *P.* Batheaston, Hartham, &c., in meadows, Spring. This species is much used in cooking to flavour soups, &c.

M——— semilibera *Dc.* Batheaston. This species was very abundant in April, 1871, on dead leaves, &c., and among grass, but has not occurred since; it had a very disagreeable odour.

M——— conica *Kromb.* In the grounds of Blaize Castle, near Bristol.

GENUS 258. HELVELLA.* *L.*

Helvella crispa *Fr.* Not uncommon under beech trees; Batheaston and other places.

H——— lacunosa *Afz.* In woods; Box and other places not uncommon.

H——— sulcata *Lév.* Bowood, October, 1863.

H——— elastica *Bull.* Bowood, Wilts, September, 1872; in woods.

H——— ephippium *Lév.* Batheaston, Leigh Woods, &c.; in woods.

GENUS 259. VERPA.† *Swartz.*

Receptacle clavato-pileate, hollow below and inflated, or conical and depressed, equally deflexed all round; hymenium rugulose, but not costate, or nearly even.

Verpa digitaliformis *P.* Batheaston, 28th April, 1867. Rev. T. P. Rogers. This species was very abundant at Batheaston and the neighbourhood in April and May, 1871, but has not been observed since; it generally occurs under walls, among shrubs, &c., in grassy, waste places.

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* The Latin name of some fungus.

† The Verpa was a symbol used in the idolatrous worship of Bacchus.

GENUS 260. MITRULA.* *Fr.*

Soft and fleshy, simple, capitate; stem distinct; hymenium surrounding the inflated club.

Mitrula cucullata *Fr.* Fir plantation near Box.

M—— paludosa *Fr.* On dead leaves in pools of water; Shapwick, Somerset.

GENUS 261. SPATHULARIA.† *P.*

Disc capitate, compressed, running down into the stem on either side.

Spathularia flavida *P.* In woods; Lucknam, Bathford, and other places.

GENUS 262. LEOTIA.‡ *Hill.*

Receptacle pileate, supported in the centre by the stem; margin revolute, covered everywhere with the smooth, somewhat viscid hymenium.

Leotia lubrica *P.* In woods common; Leigh Woods, Bowood, &c.; autumn.

GENUS 262½. VIBRISSEA.§ *Fr.*

Receptacle capitate, supported in the centre by the stem, covered above with the hymenium. Margin adnate to the stem. Asci and filiform sporidia bursting forth, and rendering the hymenium velvety.

Vibrissea turbinata *Phillips.* C. Bucknall, Esq.; l.c. vol. iii., p. 7. Abbot's Leigh, April, 1880.

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* From the receptacle resembling a little mitre.

† From Spathula, a little spoon.

‡ From the Greek leiotes, signifying smoothness.

§ Vibrissea, from vibro, to vibrate.

GENUS 263. GEOGLOSSUM.* *P.*

Receptacle clavate, simple, confluent with the stem. Hymenium surrounding the club.

G——— viride *P.* Leigh Woods, near Brockley, &c.

G——— olivaceum *P.* Bathford Hill, Leigh Down; very abundant one year on the former, very rare since.

G——— glutinosum *P.* Hanham, on open, waste ground; October and November.

G——— glabrum *P.* Leigh Down, Hanham; Autumn.

G——— hirsutum *P.* Open ground, very common; Autumn.

GENUS 264. PEZIZA.† *L.*

Cup-shaped; cup more or less concave; soon open; disc naked; asci fixed.

PEZIZA. Series I. ALEURIA.‡ *Fr.*

Fleshy, or between fleshy and membranaceous, externally pruinose or floccoso-furfuraceous; mostly growing on the ground.

Subgenus 1. DISCINA.§ *Fr.*

Cup always open, or connivent when young; veil superficial.

P—— (Discina) acetabulum *L.* Batheaston, Bathford, &c.; not uncommon under beech trees; Spring, a very elegant species.

P—— (Discina) venosa *P.* Batheaston, April. This species appears at Elmhurst every Spring, growing to a large size; it has a strong odour of nitre.

P—— reticulata Greville.

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* From ge the earth, and glossa the tongue.

† From pezica, a word used by Pliny to denote some fungus.

‡ Aleuria, from aleuron, meal.

§ Discina, from discus, a plate or disk.

P—— (Discina)] badia *P.* Bathford, Batheaston, &c, common in the woods.

P—— (Discina) onotica *P.* Bowood, Hanham, where it has occurred as large as a cheese-plate; in woods on the ground.

P—— (Discina) aurantia *Fr.* Nailsea, near Bristol; on or about the places where oak trees have been thrown, also on open heaths.

P—— (Discina) cochleata *Huds.* Bathford, Batheaston and Bowood; where the variety alutacea *Fr.* occurred in Sept., 1872; of a pale lemon colour.

P—— (Discina) repanda *Wahl.* St. Catherine's and Bathampton, on old stumps, Box.

P—— (Discina) succosa *B.* Annals Nat. Hist., No. 156. Batheaston, Leigh Woods, on the ground.

P—— (Discina) vesiculosa *Bull.* Batheaston, on dunghills and thatch.

P—— (Discina) micropus *P.* Badminton. Rev. M. J. Berkeley.

P—— (Discina) radula *B. and Br.* Annals Nat. Hist., Ser. I., Vol. xviii., p. 77. Hanham Woods, Autumn; a single specimen only has occurred hitherto.

P—— (Discina) viridaria *B. and Br.* Annals Nat. Hist., No. 555. On walls and in damp greenhouses; abundant in some years; Batheaston.

Subgenus 2. GEOPYXIS.* *Fr.*

Veil innate; cup when young subglobose, closed, then open and orbicular. Substance fleshy, rarely fibrous.

P—— (Geopyxis) tuberosa *Bull.* Bowood, Leigh Woods. Springs from a large, black, Sclerotium buried in the soil in woods. Hedwig supposed the Sclerotium to be a dried root of the wood Anemone, but Tulasne has investigated the

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* From ge the earth, and pyxis a small box.

subject and he found that the Sclerotium is often produced on the decaying roots of the Anemone, whence it throws out roots and a stem bearing the cups of the Peziza, analogous to the development of insect Sphæriæ.

P—— (Geopyxis) macropus *P.* Bowood, Charlton, Somerset, Lucknam; on the ground in woods.

P—— (Geopyxis) carbonaria *A. and S.* Lucknam.

Subgenus 3. HUMARIA.* *Fr.*

Veil thin, sub-marginal, flocculose, fugacious; cup sessile, entire, hemispherical, flattened; colour bright; terrestrial.

P—— (Humaria) granulata *Bull.* On cow dung, very common.

P—— (Humaria) rutilans *Fr.* Hanham, October and November, on bare, gravelly spots, among mosses, &c.

P—— (Humaria) melaloma *A. and S.* Hanham, on ground where there has been a fire; Bowood, Autumn.

P—— (Humaria) leucoloma *Reb.* Batheaston, on wall tops and on the ground.

P—— (Humaria) humosa *Fr.* Hanham, Leigh Woods, on the ground.

P—— (Humaria) macrocystis *Cooke.* Leigh Woods, October, 1880. C. Bucknall, l.c. iv., p. 7.

P—— (Humaria) glumarum *Desm.* On chaff, Cliffe Pypard, Wilts.

P—— (Humaria) omphalodes *Bull.* Bathampton, Bowood, on the ground where there has been a fire.

P—— (Humaria) brunneo-atra *Desm.* Leigh Woods, 28th August, 1848, on the ground; a single specimen only found.

P—— (Humaria) subhirsuta *Schum.* Batheaston, on clayey banks.

P—— (Humaria) misturæ *Phillips.* Cotham, Bristol. A. Leipner, Esq., C. Bucknall, l.c., Vol. iii., p. 7.

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* Humaria, from humus, the ground.

Subgenus 4. ENCŒLIA.* *Fr.*

Veil general, fugacious, furfuraceous, cups very hollow, from fleshy becoming coriaceous, firm or fragile; growing on bark, sub-erumpent, not innate but freely developed.

P—— (Encœlia) furfuracea *Fr.* Leigh Woods, on sticks and branches.

P—— (Dermatea) dryina *K.* Leigh Woods, February, 1880. C. Bucknall, l.c. iii., 9.

Series II. LACHNEA.† *Fr.*

Veil distinct, decidedly villous, or pilose, persistent; cup in consequence bristly or hairy, always closed when young; substance waxy, firm, rarely fleshy.

Subgenus 5. SARCOSCYPHA.‡ *Fr.*

Fleshy, veil villous.

P—— (Sarcoscypha) coccinea *Jacq.* Common on sticks partly buried in the ground. This beautiful species attracts attention by its brilliant scarlet colour. It has occurred at Batheaston pure white and also egg-yellow, February and March; common on banks and borders of woods, &c.

P—— (Sarcoscypha) melastoma *Sow.* Portbury, near Bristol, on dead Ling, May, 1847.

P—— (Sarcoscypha) hemispherica *Wigg.* Common on the ground in woods, Batheaston.

P—— (Sarcoscypha) hirta *Schum.* On the ground, Bowood.

P—— (Sarcoscypha) trechispora *B. and Br.* Annals Nat. Hist., Series I., Vol. xviii., p. 77.

P—— (Sarcoscypha) umbrata *Fr.* Monkton Farleigh, Leigh Down, on clayey banks, sides of roads, &c.

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* Encœlia, from enkoilos, hollow within.

† Lachnea, from lachne, down.

‡ Sarcoscypha, from sarx, flesh, and skuphos, a cup.

P—— (Sarcoscypha) coprinaria *Cooke*. Grev., 1875, 91. Batheaston, March, 1877.

P—— (Sarcoscypha) hirta *Schum*. Bowood.

P—— (Sarcoscypha) vitellina *P*. Bowood.

P—— (Sarcoscypha) scutellata *L*. Box, Langridge, &c., on dead and rotten wood, common.

P—— (Sarcoscypha) stercorea *P*. Batheaston, &c., common on cow dung.

P—— (Sarcoscypha) theleboloides *A. and S*. Batheaston, St. Catherine's, on spent hops. This species occurred at Batheaston of two colours, red and yellow, growing together and differing chiefly in colour; Dr. Cooke considers them specifically different. The red form he names P. (Sarcoscypha) rubra. *Cooke* mycographia, fig. 152.

P—— (Sarcoscypha?) brunneola *Desm*. On beech mast. C. Bucknall, l.c., Vol. iii., p. 7.

P—— (Sarcoscypha) pellita *P*. Brockley Combe, May. C. Bucknall, l.c. iii., 8.

P—— (Sarcoscypha) gregaria *Rehm*. Leigh Woods, Sept., 1881. C. Bucknall, l.c. v., 6.

Subgenus 6. DASYSCYPHA.*

Waxy, dry, villous.

P—— (Dasyscypha) virginea *Batsch*. Very common on sticks, dead wood, &c.

P—— (Dasyscypha) nivea *Fr*. St. Catherine's, &c. This species is not easily distinguished from P. virginea, differing chiefly in the "nature of the down, less distinct stem, which is incrassated upwards." Cooke. Handbook of British Fungi, p. 685.

P—— (Dasyscypha) calycina *Schum*. Common on dead sticks of larch and firs; a very pretty species.

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* Dasyscypha, from dasus, villous, and skuphos, a cup.

P—— (Dasyscypha) bicolor *Bull.* Batheaston, on dead twigs.

P—— (Dasyscypha) cerinea *P.* On wood, Batheaston.

P—— (Dasyscypha) caulicola *Fr.* Common on dead stems of herbaceous plants, Lucknam, &c.

P—— (Dasyscypha) corticalis *P.* On dead bark, Batheaston, common. Nothing can be more beautiful than this little species when each hair is tipped with a drop of dew.

P—— (Dasyscypha) melaxantha *Fr.* On fallen branches, Batheaston.

P—— (Dasyscypha) Schumacheri *Fr.* Rudlow, Combe Hay.

P—— (Dasyscypha) variecolor *Fr.* Batheaston, on rotten wood.

P—— (Dasyscypha) echinulata *Awd.* Leigh Woods, Aug., 1880. C. Bucknall, l.c. iv., 7.

P—— (Dasyscypha) solfatera *C. and E.* Clifton Down. C. Bucknall, l.c. iii., 8.

P—— (Dasyscypha) micacea *P.* Leigh Woods, July, 1879. C. Bucknall, l.c. iv., 7.

P—— (Dasyscypha) filicea *C. and Ph.* Cheddar, July, 1881. C. Bucknall, l.c. v., 6.

P—— (Dasyscypha) Rhytismæ *Phillips.* Leigh Woods, May, 1881. C. Bucknall, l.c. v., 6.

P—— (Dasyscypha) trichodea *Phillips.* Clifton Down. C. Bucknall, l.c., Vol. iii., p. 8.

P—— (Dasyscypha) araneo-cincta *Phillips.* On birch leaves, Autumn. C. Bucknall, l.c. iii., 8.

P—— (Dasyscypha) aspidiicola *B. and Br.* Leigh Down, June. C. Bucknall, l.c. iii., 8.

P—— (Dasyscypha) fugiens *Bucknall.* Mangotsfield, June, 1880; Abbot's Leigh, March, 1881. C. Bucknall, l.c. iv., 7.

P—— (Dasyscypha) episphæria *Mart.* On Hypoxylon multiforme, Batheaston.

P—— (Dasyscypha) hyalina *P.* Batheaston, common on dead wood.

P—— (Dasyscypha) sulphurea *P.* On dead nettle stems, &c., common.

P—— (Dasyscypha) rufo-olivacea *A. and S.* On dead bramble, Batheaston, March, 1870.

P—— (Dasyscypha) villosa *P.* Rudlow. This species resembles externally Cyphella Curreyi, from which the fructification distinguishes it.

P—— (Dasyscypha) Grevillei *B.* Eng. fl. v., p. 198. P. nidulus *Grev.* Batheaston, on Carex paniculata.

P—— (Dasyscypha) apala *B. and Br.* Annals Nat. Hist., No. 561. Batheaston, on dead rushes.

P—— (Dasyscypha) Clavariarum *Desm.* Rudlow, October, 1841, on Clavaria.

P—— (Dasyscypha) straminum *B. and Br.* Annals Nat. Hist., No. 571. On dead sheaves of wheat and grasses. Feb., 1843.

P—— (Dasyscypha) escharodes *B. and Br.* Annals Nat. Hist. No. 1,322. On dead bramble stems, St. Catherine's, Feb., 1869.

P—— (Dasyscypha) solfatera *C. and E.* Grevillea vii., p. 7. On pine leaves, woods at Clifton. C. Bucknall, Esq.

P—— (Dasyscypha) citricolor *B. and Br.* Annals Nat. Hist., No. 1,321. Batheaston, on dead wood, March, 1869.

P—— (Dasyscypha) candidata *Cooke.* Grevillea i., p. 130. January, 1874.

Subgenus 7. TAPESIA. *Fr.*

Cups waxy or subcoriaceous, crowded into a sort of crust-like stratum, or sitting on a tomentose subiculum.

P—— (Tapesia) fusca *P.* Batheaston, common on dead sticks, &c.

P—— (Tapesia) mutabilis *B. and Br.* Annals Nat. Hist., No. 564. On Aira cœspitosa, near Chippenham, Feb., 1850.

P—— (Tapesia) rhabdosperma *B. and Br.* Annals Nat. Hist., No. 1,621. On decaying oak wood, Leigh Woods, Nov., 1680.

P—— (Tapesia) domestica *Sow.* On walls at the Chippenham Station, November, 1866.

P—— (Tapesia) cæsia *P.* Langridge, Leigh Woods, March, 1873.

Subgenus 8. FIBRINA. *Fr.*

Waxy or subcoriaceous, dry, at length smooth, at first marked with adpressed hairs, margin torn or toothed.

P—— (Fibrina) siparia *B. and Br.* Annals Nat. Hist., No. 772. On elm wood, Batheaston, October, 1853.

P—— (Fibrina) phacidioides *Fr.* On Burdock stems, March, 1864.

Subgenus 9. HYMENOSCYPHA.

Cup sub-membranaceous, distinctly stipitate; hymenium distinct, thicker than the walls of the cup.

P—— (Hymenoscypha) firma *Bolt.* Batheaston, common on dead sticks.

P—— (Hymenoscypha) coronata *Bull.* St. Catherine's, Dec., 1877.

P—— (Hymenoscypha) inflexa *Bolt.* Bowood, Nov., 1863.

P—— (Hymenoscypha) nitidula *B. and Br.* Annals Nat. Hist., No. 570. On dead leaves of Aira cæspitosa, Batheaston, January, 1850.

P—— (Hymenoscypha) Candolleana *Lev.* Annales Scien. Nat., 1843, xx., 232. Raised from Sclerotium pustula under a bell-glass, Batheaston. The Sclerotium collected in Autumn at St. Catherine's; the Peziza came up in the following Spring.

P—— (Hymenoscypha) Curreiana *Tul.* Abbot's Leigh, March, 1881. C. Bucknall, l.c. iv., 7.

P—— (Hymenoscypha) cyathoidea *Bull.* Batheaston, Feb., 1869.

P—— (Hymenoscypha) Amenti *Batsch.* Langridge, on catkins of Abele, March, 1869.

Subgenus 10. MOLLISIA.

Freely evolved, smooth; cups turbinato-stipitate or sessile, soft and waxy.

P—— (Mollisia) hepatica *Batsch.* Warley Common, on the ground beneath rabbits' dung, and on the dung itself, Jan., 1864.

P—— (Mollisia) Clavus *A. and S.* Hartham Park, April, 1843.

P—— (Mollisia) vinosa *A. and S.* Very common on dead sticks.

P—— (Mollisia) atro-virens *P.* Langridge, April, 1874.

P—— (Mollisia) cinerea *Batsch.* Common on dead wood, Jan.

P—— (Mollisia) spherioides *P.* Rudlow, 1843, on dead stems of Lychnis.

P—— (Mollisia) leucostigma *Fr.* Lucknam, December, 1866.

P—— (Mollisia) atrata *P.* Lucknam, Batheaston, 1843, on dead herbaceous stems.

P—— (Mollisia) dematiicola *B. and Br.* Annals Nat. Hist., No. 1,070. March, 1863, Spye Park, on rotten wood amongst the flocci of some Helminthosporium.

P—— (Mollisia) fusarioides *B.* Mag. of Zool. and Bot. i.. 1837. This is the ascigerous state of Fusarium tremelloides *Grev.* Common, dead nettle stems.

P—— (Mollisia) erumpens *Grev.* Hartham Park, May, 1843, on petioles of Sycamore.

P—— (Mollisia) cornea *B. and Br.* Annals Nat. Hist., No. 578. Batheaston, March, on dead stalks of Carex paniculata.

P—— (Mollisia nervisequia *Desm.* On leaves of Plantago lanceolata, Batheaston, February, 1866.

P—— (Mollisia) elaphines *B. and Br.* Annals Nat. Hist., No. 1,325. St. Catherine's, January, 1869, on dead wood.

P—— (Mollisia) aquosa *B. and Br.* Annals Nat. Hist., No. 1,326. St. Catherine's.

P—— (Mollisia) vulgaris *Fr.* Common on dead wood, &c. December.

P—— (Mollisia) minutissima *Batsch.* On dead bramble stems, January, 1864, Batheaston.

P—— (Mollisia) erythrostigma *B. and Br.* Annals Nat. Hist. No. 1,168. Parasitic on Sphæria phæostroma, Batheaston, Winter.

P—— (Mollisia) punctoidea *Karst.* C. Bucknall, Portbury, June, l.c. iii., 8.

P—— (Mollisia?) inflatula *Karst.* Leigh Woods, Stapleton Park. C. Bucknall, l.c. iii.; 8.

P—— (Belonidium) pulla *Ph. and K.* Belonidium pullum Grev. vi., p. 73. The Avon, May, 1880. C. Bucknall, l.c. iii., 9. The Genus Belonidium *Dc. Nots.* is intermediate between Peziza and Helotium.

GENUS 265. HELOTIUM.* *Fr.*

Disc always open, at first punctiform, then dilated, convex or concave, naked. Excipulum waxy, free, marginate, externally naked.

Subgenus 1. PELASTEA. *Fr.*

Disc convex; receptacle hollow beneath or flattened.

Helotium aciculare *P.* Hanham, April, 1847.

H——— æruginosum *Fr.* Brockley Combe, January, 1845.

H——— virgultorum *Fr.* Bowood, October, 1863.

H——— conigenum *Fr.* Lucknam, December, 1864.

Subgenus 2. CALYCELLA. *Fr.*

At first turbinate, disc concave, stem firm when present.

H——— calyculus *Fr.* Rudlow, September, 1842.

H——— citrinum *Fr.* Common dead sticks, Winter.

H——— pallescens *Fr.* Rudlow, September, 1842.

H——— ochraceum *Fr.* Common on old stumps.

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* From elos a nail, Greek.

H——— claro-flavum *B.* Eng. Fl., Vol. v., p. 20.

H——— versiforme *Fr.* Batheaston, January, 1851.

H——— herbarum *Fr.* Rudlow, September, 1842.

H——— epiphyllum *Fr.* Hanham, October, 1873.

H——— fagineum *Fr.* Common on beech mast.

H——— pruinosum *Jerdon.* Annals Nat. Hist., No. 1,174. St. Catherine's, February, 1859.

H——— scutula (P.) *Karst.* Batheaston, on dead stems of Rudbeckia hirta, October, 1878.

H——— flavum *Kl.* Glen Frome, March, 1880. C. Bucknall, l.c. iv., 7.

H——— albo-punctatum *Desm.* Leigh Down, November, 1879. C. Bucknall, l.c. iv., 7.

GENUS 266. PATELLARIA. *Fr.*

Receptacle patellæform, margined, always open; hymenium even, sub-persistent, but dusty from the breaking up of the asci; asci fixed.

P——— atrata *Fr.* Batheaston, not uncommon on dead wood.

P——— proxima *B. and Br.* Annals Nat. Hist., No. 965. Batheaston, on oak, December, 1859.

P——— clavispora *B. and Br.* Annals Nat. Hist., No. 774. Lucknam, on twigs of Privet, November, 1852.

P——— atro-vinosa *Blox.* Linn. Trans. xxiv., p. 155. Batheaston, on dead blackthorn, March, 1869.

P——— olivacea *Batsch.* Batheaston, on a rotten willow, prostrate, October, 1863.

P——— atro-alba *Cooke.* Handbook of Brit. Fungi, p. 718. Bathford Hill, on Privet, November, 1875.

P——— discolor *Mont.* Batheaston, on fallen branches Langridge, March, 1872.

P——— rubro-tingens *B. and Br.* MSS. cupulis minutis, aggregatis, sessilibus, rubro-nigris, lignum colore rubro tingentibus; ascis claviformibus, octosporis; sporidiis ellipticis, paraphy-

sibus apice curvatis. This species forms a dense mass of blackish-red cups occupying the cracks in the wood of fallen branches of oak, and staining it red around the spot. The sporidia are narrow-elliptic and contain three or four globular masses of endochrome, which probably form septa at a later period. The sporidia are about 0,0005 inch long. The paraphyses are strongly curved at the tip and project slightly above the clavate asci.

P——— compressa *A. and S.* Batheaston, on dead wood.

P——— flexella *Fr.* On dead wood, Batheaston.

P——— lignyota *Fr.* On dead wood, Batheaston, not uncommon.

P——— lecideola *Fr.* On dead wood, Batheaston, March, 1873.

GENUS 267. TYMPANIS.* *Tode.*

Receptacle margined, cyathiform, horny; hymeninm at first veiled, then breaking up.

T——— conspersa *Fr.* On apple, Batheaston, February, 1861.

T——— fraxini *Schum.* Leigh Woods. C. Bucknall, February, 1880, l.c. iii., 9.

T——— saligna *Tode.* Bathford, on Privet, November, 1875; Ford, Wilts, February, 1850.

GENUS 268. CENANGIUM.† *Fr.*

Receptacle coriaceous, closed at first, then open, marginate, covered with a thick cuticle; hymenium persistent.

C——— Ribis *Fr.* Langridge, Somerset, April, 1872.

C——— pulveraceum *Fr.* Batheaston, March, 1864, on Prunus lauro-cerasus.

C——— fuliginosum *Fr.* St. Catherine's, April, 1865.

C——— ferruginosum *Fr.* On poles, Bathford Hill, Jan., 1865.

C——— quercinum *Fr.* Bushton, Wilts, January, 1853.

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* From tumpanon, a drum.

† From kenos empty, and aggeion a vessel.

GENUS 269. ASCOBOLUS.* *Tode.*

Receptacle orbicular, marginate; disc patelloeform; asci exploded.

A——— furfuraceus *P.* Very common on cow dung, Batheaston, September.

A——— vinosus *B.* Eng. Fl. v., p. 209. On rabbits' dung, Batheaston, October, 1863. Paraphyses were observed in one instance throwing off wedge-shaped 1-septate conidia, September, 1863.

A——— ciliatus *Schum.* Batheaston, November, 1865, on cow and horse dung.

A——— glaber *P.* Bathford Hill, October, 1863, on rabbits' dung.

A——— testaceus *B. and Br.* Annals Nat. Hist., No. 1,082. On sheeps' dung, Bathford, September, 1863, and on old linen, Batheaston. Peziza testacea *Mougt.*

A——— denudatus *Fr.* Marlborough Forest, October, 1863, on twigs and rootlets.

A——— viridis *Currey.* Linn. Trans. xxiv., p. 154, 1863. Leigh Woods, 1848; Hanham, on clayey ground.

A——— Kerverni *Crouan.* Batheaston, 1868, on sheeps' dung.

A——— granuliformis *Crouan.* On cow dung, Batheaston, November, 1864.

A——— 6-decemsporus *Crouan.* Hanham, October, 1863, on horse dung.

A——— macrosporus *Crouan.* Batheaston, Bathford, on sheep and horse dung.

A——— miniatus *Crouan.* Hanham, December, 1865. M. Boudier in his treatise on Ascobolus, Ann. des Scien. Nat., Series v., Vol. x., p. 527, removes this species to the section Humaria of Peziza, because the sporidia contain "guttules," but if they are examined when mature it will be seen that the "guttules" are only the forerunners of reticulations resembling those of the fruit of certain truffles.

* From ascos a vessel, and ballein to project.

A——— carneus *P.* Batheaston, on cow dung.

A——— depauperatus *B. and Br.* Annals Nat. Hist., No. 1,084. December, 1864.

A——— microsporus *B. and Br.* Annals Nat. Hist., No. 1,087. Batheaston, November, 1865, on cow dung.

A——— Cookei *Boudier.* Batheaston, April, 1871, on dogs' dung.

A——— Trifolii *B. Eng.* Fl. v., p. 209. Hanham, August. Phacidium Trifolii *Boudier.*

A——— consociatus *B. and Br.* Annals Nat. Hist., No. 1,491. Langridge, Somerset, April, 1870, on dead wood.

A——— (Saccobolus) neglectus *Boudier.* Leigh Down, January, 1881. C. Bucknall, l.c. iv., 7.

A——— (Ryparobius) argenteus *B. and Br.* Leigh Down, January, 1881. C. Bucknall, l.c. iv., 8.

A——— (Thecotheus) Pelletieri *Crou.* C. Bucknall, l.c. iii., 9. Clifton, March, 1880.

A——— (Ascophanus) lacteus *C. and Ph.* Stapleton Park, April, 1879. C. Bucknall, l.c. iii., 9.

GENUS 270. STICTIS.* *P.*

Receptacle obsolete; hymenium even, determinate, orbicular and elliptic, immersed in the matrix, at first veiled.

S—— (Propolis) versicolor *Fr.* Rudlow, December, 1841.

S—— (Eustictis) radiata *P.* Rudlow, April, 1843.

S—— (Eustictis) chrysophæa *Fr.* Batheaston, on Wych elm, October, 1869.

S—— ( ) graminum *Desm.* Batheaston, June, 1867.

S—— Berkleyana *Dr. and Lév.* Sandy Lane, May, 1881. C. Bucknall, l.c. v., 6.

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* From stiktos, dotted.

GENUS 271. BULGARIA.* *Fr.*

Receptacle orbicular, then truncate, glutinous within, at first closed; hymenium even, persistent, smooth.

B——— inquinans *Fr.* On oak-timber, common.

B——— sarcoides *Fr.* On stumps, common. Tremella sarcoides is an early state of this plant.

GENUS 272. AGYRIUM.† *Fr.*

Receptacle compact, homogeneous waxy, gelatinous when moist, innate, sessile, sphærical, even, smooth and fructifying all round; asci fixed.

A——— rufum *P.* Not uncommon on fir wood.

GENUS 273. PHACIDIUM.‡ *Fr.*

Perithecium bursting irregularly in the centre, by valvular teeth.

P——— Populi *Lasch.* Batheaston, March, 1882, on Abele.

P——— Lauro-cerasi *Desm.* Rudlow, September, 1842.

P——— simulatum *B. and Br.* Langridge, Somerset, on dead stalks of Clinopodium vulgare, April, 1859.

P——— Patella *Fr.* Rudlow, March, 1843; St. Catherine's, February, 1859, in good fruit.

P——— pini *Schum.* Combe Hill, March, 1882. C. Bucknall, l.c. v., 6.

P——— Ranunculi *Lib.* Batheaston, November, 1882.

ORDER 24. PHACIDIACEI.

Receptacle more or less coriaceous or carbonaceous; disc at length exposed by the regular or irregular fissure of the outer coat.

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† From balga, a leathern bag.

‡ From a without, and guros a wrinkle.

§ From phake a lentil, and eidos a resemblance.

GENUS 274. RHYTISMA.*

Perithecia forming a confluent mass, opening by flexuous fissures.

R——— acerinum *Fr.* Very common. The early state of this plant is Melasmia acerina *Lév*, and occurs in Autumn; in the following Spring the ascophorous state is developed.

GENUS 275. HYSTERIUM.† *Tode.*

Perithecium labiate; border entire; orifice narrow-linear; asci elongated.

H——— Pinastri *Schrad.* Lucknam, February, 1850, on leaves of Pinus pinea.

——— var. B. juniperi. Rudlow, December, 1844.

H——— foliicolum *Fr.* On Cratœgus Crus-galli, Shockerwick, April, 1857.

H——— Fraxini *P.* Batheaston, June, 1867.

H——— pulicare *P.* Batheaston, Winter, on bramble, dead wood, &c.

H——— elongatum *Wahl.* Batheaston, on bramble, &c.

H——— caricinum *Desm.* Spye Park, on Carex paniculata, February, 1850.

H——— rufum *B. and Br.* MSS. Immersed in the substance of the leaf, crumpent, elliptic or linear, lips black, narrow, open when moist, closed when dry; disc pale reddish-brown, about 0,01 to 0,03 inch long; asci clavate, 0,0025 inch long; paraphyses linear, strongly curved at the summit; sporidia elliptic, obtuse at the ends, containing 4-6 globose sporidiola; related to H——— caricinum, but differing in the red colour of the disc. On some Carex, Spye Park, May, 1843.

H——— angustatum *A. and S.* Durdham Down, March, 1879. C. Bucknall, l.c. iii., 9.

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* From rutis a wrinkle.

† From ustera, pointing to the peculiar form of the Genus.

H——— sclerotioides *B.* Bristol, A. Leipner, Esq., in a flower pot. C. Bucknall, l.c., Vol. ii., p. 348.

H——— (Lophodermium) Neesii *Duby.* The Gully, January, 1882. C. Bucknall, l.c. v., 6.

ORDER 25. TUBERACEI.

Hypogæous; hymenium waved and sinuate, often intricate and closely packed.

GENUS 276. TUBER.* *Mich.*

Asci short, saccate, disposed in sinuous veins; sporidia elliptic, reticulate, often echinulate; peridium warty or tubercled, rarely smooth, without any definite base.

T—— brumale *Mich.* Batheaston, Corsham Park, November.

T—— œstivum *Vitt.* Our common eatable truffle. Batheaston. Bathford, Combe Hay, Castle Combe, &c., under beech and hazel, Autumn and Winter, on chalk or limestone soils.

T—— macrosporum *Vitt.* Near Bristol and Batheaston, chiefly under oak trees, Autumn. This species has a strong odour of garlic. It is not much eaten in Italy on account of its small size and thick rind; it is too scarce in England to be in culinary use.

T—— bituminatum *B. and Br.* Annals Nat. Hist., No. 581. M. Talasne considers this to be T. mesentericum *Vitt*, but he does not describe the peculiar odour, merely saying, "odor gravis." The odour in our plant is pungent, resembling that of horse-radish or tar. In sandy ground under beech trees, Bowood, Autumn.

T—— rufum *Pico.* Batheaston, near Bristol, &c. Not uncommon, chiefly in fir woods, or where there is a mixture of fir trees. It is not used for food. Autumn and Winter.

T—— scleroneuron *B. and Br.* Annals Nat. Hist., No. 582. Tulasne considers this plant too close to T—— rufum *Vitt* to

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* From Tuber, a Latin name for some fungus.

constitute a good species. It is remarkable for ts cartilaginous consistence, which is much more tough and hard than in the latter. Bowood, in sandy ground under beech trees, Autumn.

T—— nitidum *Vitt.* Rudlow, plantations, Autumn.

T—— puberulum *B. and Br.* Annals Nat. Hist August, 1846, Hanham, Leigh Woods, &c. This plant is frequently the habitat of Hypocrea inclusa *B. and Br.*, one of the Sphœriacei. When there it may be detected by a minute, rusty spot in the flesh of the Truffle. Tulasne regards it as identical with his Tuber rapæodorum, and observes that other species are downy when young.

T—— dryophilum *Tul.* Hanham and Lucknam. This species comes very close to T—— maculatum *Vitt*, and according to Tulasne himself also to T. Borchii *Vitt.* It is very possible that too many species have been made of the Genus; they differ so much in the fresh and dry state that the difficulties of discrimination are great.

T—— excavatum *Vitt.* This species occurred at Rudlow so long ago as 1843, since which time it has laid accidentally unnoticed in my herbarium. Bathford, Leigh Woods, &c.

T—— Borchii *Vitt.* A specimen then referred to this species occurred near Abbot's Leigh, Bristol, in 1845. There is still no reason to consider it anything else.

T—— microsporum *Vitt.* A small truffle which seemed to belong to this species occurred to the late Dr. Thwaites and myself in Stapleton Grove, near Bristol, in October, 1845. The grove is unfortunately now destroyed, and I mention the circumstance to draw the attention of Bristol botanists to that neighbourhood, as the grove was very rich in mycology.

GENUS 277. CHOIROMYCES.* *Vitt.*

Common integument even; base definite; asci clavate; sporidia spherical.

* From choiros a hog, and mukes a fungus, probably from its strong odour.

C——— meandriformis *Vitt.* Marlborough Forest, Wilts, October, 1847, under beech trees. It has occurred since on the same spot. It is figured by Sowerby, fig. 310.

GENUS 278. PACHYPHLŒUS.* *Tul.*

Common integument warty, opening by a terminal aperture; base distinct; asci clavate; sporidia spherical.

P——— melanoxanthus *Tul.* Bowood, Wilts, November, 1843, under beech and mixed woods.

P——— citrinus *B. and Br.* Annals Nat. Hist., Ser. i., Vol. xviii., p. 79. Portbury, near Bristol, September, 1844, Hanham, &c. Tulasne refers this plant to P——— melanoxanthus, but I never saw the latter of the lemon-yellow colour of the former.

P——— conglomeratus *B. and Br.* Annals Nat. Hist., Ser. i., Vol. xviii., p. 80. Hanham, October, 1845. This plant appears to grow attached to small sticks under dead leaves, &c.; it was very rare at Hanham, but the species was confirmed by specimens found in woods near Lucca.

GENUS 279. STEPHENSIA.† *Tul.*

Common integument fleshy, cottony; base distinct; hymenium intricate; asci cylindrical; sporidia globose, even.

S——— bombycina *Tul* l.c., p. 130. Genea bombycina *Vitt.* Castle Combe, Wilts, October, 1843, near Bristol, Batheaston, &c.; the only species.

GENUS 280. HYDNOTRYA.‡ *B and Br.*

Annals Nat. Hist., Series i., Vol. xviii., p. 78.

Common integument minutely papillose, not distinct; hymenium

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* From pachus thick, and phloios bark.

† The Genus was dedicated by Tulasne to Dr. H. O. Stephens, of Bristol, a good mycologist of the time. *Tul* Fungi hypogœi, p. 129, t xii.

‡ From udnon a truffle, and truo to bore a hole.

complicated with gyrose lacunæ, leading to the surface; asci oblong; sporidia globose, tuberculate; the asci are arranged in a single row at the sides of the lacunæ.

H——— Tulasnei *B. and Br.* Annals Nat. Hist. l.c. Spye Park, in sand under beech trees, August, 1843; Stourhead, Wilts, in similar places.

GENUS 281. HYDNOBOLITES.* *Tul.*

Fungi Hypogœi, p. 126, ls. 4, 14.

Integument replaced by white, evanescent down; hymenium complicated with sinuous lacunæ, ending at the surface; asci elliptic; sporidia globose, reticulated; the asci are arranged in several rows at the sides of the lacunæ.

H——— cerebriformis *Tul* l.c. Stapleton Grove, near Bristol, 1845, Leigh Woods, &c.; the only species.

GENUS 282. SPHŒROSOMA.† *Kl.*

Common integument altogether wanting; hymenium exposed, even or rugose, solid or lacunose; asci linear; sporidia spherical, tuberculate, dark brown.

S——— ostiolatum *Tul.* MSS. B. and Br. Annals Nat. Hist., Ser. i., Vol. xviii., p. 79. Hanham, near Bristol, under dead leaves in loose soil, November, 1845. This plant has not been met with since in Britain till 1882, when several specimens were found by Messrs. Phillips and Plowright in Shropshire.

GENUS 283. BALSAMIA.‡ *Vitt.*

Tuberacei, p. 30.

Common integument warty; hymenium complicated with distinct lacunæ, not leading to the surface; sporidia cylindrical or oblongo-elliptic, even, pellucid.

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* From udnon a truffle, and Boletus?

† From sphairos round, and soma a body.

‡ From Dr. Joseph Balsamo, an Italian botanist.

B——— platyspora *B. and Br.* Annals Nat. Hist., No. 318. Corsham Park, Wilts, 6th October, 1843.

B——— vulgaris *Vitt.* Abbot's Leigh, near Bristol, October, 1848.

B——— fragiformis *Tul.* Bathford, November, 1859. A group of about 30 individuals occurred in a small mixed plantation of firs, &c., whence the G. W. Railway had removed the soil to make their embankment, but it has not occurred there since.

GENUS 284. GENEA.* *Vitt.*

Common integument warty, with an aperture at the apex; hymenium waved and sinuated, but not forming an intricate mass; asci cylindrical; sporidia sub-globose or elliptic, verrucose.

G—— verrucosa *Vitt.* Bowood, November, 1843; Stapleton, near Bristol.

G—— Klotschii *B. and Br.* Annals Nat. Hist., Ser. i., Vol. xviii., p. 78. Stapleton, near Bristol, October, 1848.

G—— spherica *Tul.* Leigh Woods, August, 1845.

G—— hispidula *B. and Br.* Annals Nat. Hist., Ser. i., Vol. xviii., p. 78. Hanham, October, 1845; Spye Park, 1848.

GENUS 285. TROCHILA.† *Fr.*

Disc innate, crumpent, placed upon a black hypothecium, persistent.

T—— Craterium *Fr.* On dead ivy leaves, common.

GENUS 286. LOPHIUM.‡ *Fr.*

Perithecium stipitate, wedge-shaped, opening with a narrow, longitudinal fissure; asci elongated.

L——— mytilinum *Fr.* Lucknam, April, 1865; Batheaston, March, 1872.

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* Named after Dr. Gene, an Italian naturalist.

† From trochalos, a round object.

‡ From lophos, a crest.

GENUS 287. STEGIA.* *Fr.*

Perithecium orbicular, splitting horizontally; operculum deciduous.

S—— Ilicis *Fr.* Common on holly leaves.

Notice of a rare Capture, followed by Remarks on Variation of Structure and Instincts in Animals.† *By the* REV. LEONARD BLOMEFIELD, M.A., F.L.S., F.G.S., &c., *President.*

(Read December 12th, 1883.*)*

A rare and remarkable coleopterous insect was taken on a wall in the Wells Road, close to Bath, in September last, being a valuable addition to our Bath Entomologia. This insect belongs to the family of Cerambycidæ. It is the *Cerambyx ædilis* of Linnæus, placed however under a distinct genus by Megerle, with the name of *Acanthocinus.* Stephens has adopted this new genus in his "British Entomology," where the insect stands as *Acanthocinus ædilis.*‡ The specimen captured is a male of unusual size and in good condition. It is a species found throughout Europe, but rare except in Sweden, where Linnæus, in his "Fauna Succica," speaks of it as being often found in boats, and in the trunks of trees that have been decorticated; such trees being used by the peasants in the construction of their houses, and it is whilst at work that they frequently find these insects. The children there call them "Timberman," answering to "Carpenter" in our language.

In this country it is not at all common, but has been met with

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* From stegos a roof or covering.

† This paper, mostly in the form of a Lecture and containing no original matter, is printed at the request of those who heard it.

‡ *Brit. Entom., Mandibulata;* vol. iv., p. 231.

ACANTHOCINUS ODILIS.

NATURAL HIST.

in various parts of England, and in Scotland. Not improbably, in some instances, it has been introduced, in the larva state, in timber imported for building purposes.

This insect is remarkably distinguished by the extreme length of the antennæ. Most of the Cerambycidæ have the antennæ long, whence they are called *Longicornes*. But in this species they are longer, I believe, than in any other, native or foreign; sometimes attaining to four or five times, Linnæus says even six times, the length of the body. The specimen exhibited has the antennæ about four times the length of the body, which itself is an inch long, but they hardly admit, in their present dried state, of being measured accurately from their having become shrivelled and somewhat contorted since the insect was alive.*

The *Acanthocinus ædilis* is described or noticed by most of our writers on British Entomology, but none mention the size as large as that of the present specimen. Stephens sets its length at from 8 to 10 lines. Its long antennæ are very moveable, and said to be capable of being directed either forward or backward, or supported in an erect position. "When it sleeps, it reclines them along its back, as also when it walks quickly, or has to pass through a narrow tract, as the least resistance from anything in its way, would be liable to injure or break them off."

The only coloured figure of it I know is that in Donovan's British Insects;† but it represents a very small specimen, and the colour does not at all come up to the colours of the present specimen, which are brighter and more varied.‡ Donovan's

* I had no opportunity of seeing it till several days after it had been killed.

† Vol. ii., pl. 72.

‡ A coloured figure of the recently captured specimen accompanies this paper. It is curious that in the oldest of all our works on Entomology—*Moufet's Insectorum Theatrum*, published two hundred and fifty years ago, with woodcuts mostly wretchedly executed,—there is a very fair representation of this insect recognisable at a glance.

specimen was taken in May, and spring seems to be the season in which it usually occurs, though the present one was taken in the autumn.

The best description of this insect is in De Geer's valuable "Histoire des Insectes," published in 1775.* He describes and figures both sexes; the figures, though uncoloured, being very correct representations. In reference to size, he says it varies very much, but he makes no mention of any individuals coming up to the size of the Bath specimen. The females are larger than the males, but with shorter antennæ—not exceeding the length of the body. He describes the antennæ as consisting of eleven articulations, which are always the same in number, whatever be the length of the antennæ: when the latter, therefore, are very long it is due to the lengthening of each articulation, and not to additional articulations. The antennæ taper from the base to the apex, where they finish in a fine point. The eyes form a crescent surrounding the base of the antennæ. The tarsi consist of four joints, much dilated in the males, and are furnished beneath with pads.

De Geer has given a very particular account of a remarkable apparatus contained within the terminal segment of the abdomen of the female. This segment is very long and conical, but flattened above, having at the extremity a cleft, by which it is divided into two laminæ—one above and the other below. From this cleft is exserted a long tube, black, cylindrical and fleshy. In the ordinary state of repose, or when the insect is walking, there only appears externally a very small portion of this tube, but by strong pressure on the abdomen the tube is forced to show itself, and gets more and more lengthened as the pressure increases. It is then seen that, in the process of lengthening, it comes out as it were from itself, in the same way as do the horns of a snail. Under continued pressure there is a bending of the

* *Tome* v., p. 66. Pl. iv., figs. 1 and 2.

extreme tip, the curvature being always downward. This tube appears to be composed of two pieces, one being protruded from within the other. If the pressure be very strong, there comes out at last from the end of the tube two long cartilaginous filaments, blunt at the extremity, which the insect sports with during the continuance of the pressure, causing first one and then the other to come out more or less from the sheath. The total length of this apparatus, tube and filaments together, when fully exserted, exceeds the length of the whole body of the insect. There is no doubt, De Geer thinks, it is the conduit by which the ova are introduced perhaps into the cracks of the wood on which the larvæ are to feed.

It is not so easy to find a use for the strangely long antennæ of this insect, which De Geer says look as if they must be an incumbrance to it. He supposes they have their use, but he does not pretend to say what the use is. In truth, however, we know but very little of the purposes served by the antennæ of insects generally. Some have supposed them to be organs of hearing; others of smell; more often, and perhaps more rightly, they have been considered as feelers, or organs of touch. In the case of ants, whatever may be the case of other insects, Mr. Romanes observes that "the antennæ appear to be the most important of the sense-organs, as their removal produces an extraordinary disturbance in the intelligence of the animal."*

It is difficult also to explain why they should be so much more developed in some insects than in others. Many insects have the antennæ extremely short, in some cases scarce any that are discernible. These differences may depend upon differences of habits in the insects themselves. And there is one circumstance which may lead us a little way towards an answer to this inquiry; namely, the differences often observable in the two sexes, not only in the length—but also in the structure—of the antennæ. In the insect before us, the antennæ of the male are almost always

* "Animal Intelligence," p. 142.

double, and sometimes three or four times, the length of those of the female. In many other insects it is a difference of structure that so remarkably distinguishes the male antennæ. They are more composite than in the female, pectinated or plumose, or differentiated in some other way. Most persons must have noticed the beautiful feathered antennæ of the various species of gnats that often swarm in our windows during the summer months. These are the males; the antennæ of the females being perfectly simple and unadorned, setaceous, or little more than bristles. Now this circumstance makes it not improbable that the antennæ, considered generally, have their use, or one of their uses, in the relation of the sexes to each other. The Longicorn before us is often found under the bark, or in the hollows, of decayed trees, and the long antennæ of the male, perhaps in connection with some peculiar sense they possess different from any known to us, may assist in discovering the spots where the females are concealed.

This, however, is mere conjecture; and conjectures carry us but a short way towards the explanation of the multiplied phenomena of the animal kingdom. The day is gone by when final causes were appealed to as supplying reasons for this structure or that. Final causes lie entirely outside science. This was long ago perceived by Bacon, who asserts that "so far from being beneficial, they even corrupt the sciences, except in the intercourse of man with man."* And his dictum has only been more and more confirmed as science has gradually advanced from his day to the present, in which we have all Darwin's works combining to open up an entirely different line of thought. All that we can say on the subject of final causes is—that we believe the whole world to be ever working for some higher purpose than any we can thoroughly understand at present; that it forms an harmonious whole, undeniably the result of a Great First Cause;

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* "Advancement of Learning."

the harmony, however, being only kept up so long as we look at things in the aggregate. We cannot—in order to explain the differences of things—separate one thing from another in the complicated network in which they are all involved. We cannot so distinguish the multiplied agencies at work to bring about all we see, as to be able to give a reason for everything. We see, so far as relates to man, the whole tending for good; we see a general advancement in that direction; but when we restrict our view to particulars, we are soon lost in a maze of difficulties and seeming contradictions.

Any attempt to explain animal structures must be based upon a correct ascertainment, in the first instance, of all the facts bearing upon the question. It is the business of science to collect these facts,* in connection with the circumstances under which they occur. When got together science may draw certain inferences from them, but it can seldom prove its deductions to be right. We see clearly that some structures are admirably adapted for certain purposes, as that of the human hand, for instance—the subject of one of the volumes of the Bridgwater Treatises—but we see other structures, of which we cannot say whether they are of any use or not; and others again of which we can say positively that they are of no use at all.

The fact is that circumstances are always changing, often involving a corresponding change in the structures of animals, without reference to any particular purpose. An animal thus affected by its environment is compelled to adapt itself to its altered circumstances. Or rather we should say nature alone, without any thought or intention on the part of the animal,

* "The naturalist should not suffer the search or the discovery of a *Final Cause* of nature's works to make him under-value or neglect the studious indagation of their efficient causes."—*Disquisition on Final Causes*, by the Hon. Robert Boyle, p. 229. This little volume, published in 1688, is probably not much known.

gradually turns life and habits into a new channel. There are other cases in which structure is found to vary, while the surroundings—so far as we see—remain exactly as before. Or under apparently the very same conditions, we occasionally meet with variations, the same in *kind* as well as *amount*, in *two quite distinct organs*, in two different but closely allied species. This last circumstance is a very remarkable one, and it bears directly upon the case before us. The Longicorn Beetle exhibited, which has led us to these considerations as to structure and its variations, is distinguished by its extraordinarily long antennæ, and we can only conjecture what may be their use. Now it is a singular fact that in another species of the *same* Linnæan genus Cerambyx found in South America, *C. longimanus*, while the antennæ are not more developed than usual in that family, the *first pair of legs* in this insect are so astonishingly lengthened out as to be in utter disproportion with all its other measurements.* De Geer considers the *Cerambyx longimanus* as one of the largest and most remarkable species of that genus in the world. The body is two inches and a half long, and the first pair of legs is sometimes double the length of the body, while the other pairs of legs are of the usual proportions. It is also noticeable that in this insect also, as in C. ædilis, this abnormal development is confined chiefly to the males. I have suggested a use to which possibly the long antennæ of the male *C. ædilis* may be put; and whatever that use may be, we might well suppose the long fore legs of the *C. longimanus* to have a similar use. The variations in the two cases are analogous, though showing themselves in different organs. But supposing it so, who can give a reason why a pair of very long fore legs should be selected in one insect to perform the same function as a pair of very long antennæ

* See a figure of Cerambyx longimanus in *Shaw's Naturalists' Miscellany*, vol. 4, pl. 134. There is also a remarkably fine specimen of the insect itself in the Museum of the Bath Literary and Scientific Institution.

in another insect? Or why should these two species be thus differentiated from all their congeners, without any peculiarity in their habits, that we can discover, to give occasion for the anomaly? We can return no answer to these questions. Final causes utterly fail us here. Nor can science, even looking to its most recent achievements, do more than partially unravel the mystery. It would refer us to Darwin, in whose works the whole subject of variations of structure, in animals as well as plants, has been more thoroughly considered and gone into than it ever had been before. But Darwin himself hardly ventures to affirm what it is that causes structure to vary in the first instance. He only deals with the fact in its consequences. And he is led to believe that, however slight the variation may be at first, and from whatever cause it may arise, if it be of any use to the animal in which it occurs, or give the latter any advantage beyond what it had before, the variation will be availed of and, from use, go on increasing, along with, it may be, more or less of a corresponding change in the animal's habits. And these two variations—one of structure the other of habits—will continue, acting reciprocally on each other, so long as the environment remains the same. Probably, however, not longer; for what may be an advantage under some circumstances might be a disadvantage under other circumstances. In this way then structures may grow and improve, or deteriorate and finally waste away altogether, according as the conditions to which they are subjected are favourable or otherwise. Further; this growth or decay of organs is influenced by another circumstance, much dwelt upon by Darwin, viz., that whatever of change is brought about in one generation is inherited, for good or for evil, by the generation that follows after.

It may be asked now how all this applies to the case of the insect before us? It applies so far as to suggest under what circumstances, and by what means, its antennæ may have attained to their present length. Some slight increase of development,

accidental in the first instance, has been availed of by the insect, and found favourable for more effectually carrying out the purposes to which the antennæ are put; and further development has ensued. We are still ignorant as to what those purposes are; nor is it likely that we should ever know them. Even supposing insects to have the same senses that we have, their organs of sense may be constructed quite differently. Their ranges of sight and hearing may be entirely outside the ranges by which our own vision and hearing are limited. They may see objects clearly by the help of a few scattered rays of light such as would be to us no light at all; they may hear sounds utterly inaudible to human ears. Their sense of touch, in like manner, may be so delicate as to enable them to distinguish things, and slight differences in things, whether animate or inanimate, where we should feel absolutely nothing. Lastly, who shall say there may not be other senses than those we are possessed of, and of which we can form no conception, in creatures so far below us in the scale of organisation.

I might here end my remarks on this insect, and in truth there is nothing more to be said about it. But, perhaps, it may add to the interest of this afternoon's meeting if I briefly notice a few other cases of variation of structure, sometimes of instincts also, in different animals, one or two (as regards structure) bearing a close analogy to the case of the insect before us with its abnormally long antennæ.

And here I may well adduce, in the first instance, the Long-armed Ape, or Gibbon (*Hylobates agilis*), resembling in this respect the *Cerambyx longimanus*. This species is one of the *Anthropoid* Apes—so called from their nearer approach to man in form and structure than any other species of the monkey tribe. Its very remarkable arms are so long that the animal can touch the ground with its hands when standing erect. It is found in

India and its islands, living in forests and making its way among the trees, by the help of its long arms and lengthened feet, *most rapidly:*—swinging, leaping, and throwing itself from tree to tree, it sets pursuit at defiance. Now why these long arms confined to this particular species? Almost the whole of the monkey tribe are more or less *sylvicolæ* (dwellers in woods), and long arms would be as much an advantage to one species as another. We can't explain this. We can only say that gibbons must have enjoyed this advantage over a very long period of time for the arms to have attained to this growth. They are found in a fossil state in the S. of France, and it would be of interest to know if the arms of any fossil species were as long as those of the living. But this need not necessarily be, for there are some other *living* species which have not got arms of the same length as the *Hylobates agilis.*

And while on the subject of monkeys, let us consider the case of the *prehensile-tailed* monkeys of America. There are several marked characters of distinction between the monkeys of the Old world and those of the New—(though they must surely all have been derived from one and the same primitive stock originally)—but I will only dwell on the character of their tails. In a large proportion of the American monkeys—*not in all*—the tails are not only long, but their under surface, at the extremity, is denuded of hairs, and covered with a sensitive skin, rendering it as delicate a tactile organ as a man's fingers. With this tail they can grasp the bough of a tree, as a man would with his hand. Securely holding on, they can swing by it, or gradually increase the extent of the swing till able to grasp a more distant branch with their hands, and so travel on through the woods —wherever they would go—with fearlessness and the most marvellous celerity.

Now why is this advantage confined to the *New* world monkeys? The *Old* world monkeys, who also live in woods, no doubt, did they possess it, would gladly avail themselves of such a help in

travelling over thick wooded districts. But they have not got it. There are *some* too, as before stated, even of the *New* world monkeys themselves, to which the privilege has not been granted. Surely there can have been no intentional design in such a matter. It can only be referred to natural causes; to an accidental deviation from the ordinary structure of the tail in some one individual, or in several individuals perhaps, at the same time, countless generations back—found serviceable—*used*—*improved* by use and handed down as a legacy to posterity. This, I imagine, would be the Darwinian explanation, and further on I shall bring to your notice a remarkable case of deviation from ordinary habits, where we can at once *point out* the accident that occasioned it.

But I will now pass to the circumstances of a small and very peculiar animal, the Aye-Aye (*Cheiromys Madagascarienis*), one of the *Lemuridæ*, or Lemurs, a group of the Quadrumana, but of a lower grade than the monkeys in their organisation; Cheiromys itself being the lowest genus in its own family. The Lemurs are all confined to Madagascar and the adjacent islands. The animal immediately in question is found only in the deep recesses of the Madagascar forests, and is said to be very uncommon even there. It is about the size of a cat, with large, dark, bright eyes, very large naked ears, and with a peculiar arrangement of the fingers of the right-hand. There are four fingers with an opposable thumb as in the monkeys. The second, fourth and fifth fingers are of the ordinary thickness; and these fingers, along with the thumb, have all flat nails at their extremities, as the monkeys also have. But the third or middle finger is very different from the others. It is long, and so singularly attenuated—one might say *atrophied*—as almost to resemble a surgeon's probe or a seamstress's bodkin; and further, instead of having a nail at the extremity like the other fingers, it has a slender curved *claw*. What purposes now does this arrangment serve? It is connected with the habits of the animal and the food on which it lives. It is a nocturnal animal—lives in trees,

and feeds chiefly on the larvæ of timber-eating insects (such as the Cerambyx before us), which larvæ often reside quite in the heart of the wood. In the dead of the night, with its large erect ears directed forward, the Aye-Aye can hear the slightest noise. It taps with its claw upon the tree—it is made sensible of the movements of the grub, if there be one, beneath the bark—and then pares away the wood with its strong incisor teeth, till the grub is exposed. The next step is to insert its long slender finger to probe the cavity, and with its claw it drags forth the prey, and pokes it into its gullet. Who can number the ages it must have taken to perfect this structure and its marvellous adaptation to such a purpose? No other known living animal approaches the Aye-Aye in this peculiarity.

As there are structures, such as those spoken of, which must have been perfected by use, so there are others that have become completely atrophied by *disuse*. One of the most curious of these cases is that of the *blind* animals found in caves and subterranean waters both in Europe and America. The Mammoth cave in Kentucky—perhaps the most celebrated of these caves—is that of which I shall here speak. This cave extends for many miles into the heart of a limestone rock, answering I believe, geologically, to our mountain-limestone. Within the cave there are waters, some having connection with the Green river, one of the tributaries of the Ohio, which passes near its mouth, so that fish (or any other aquatic animals) can easily enter the cave if they choose, or when in make their exit. About three or four miles from the mouth of this cave—(which has been penetrated for more than 10 miles without coming to an end)—there exists a peculiar Fauna consisting of *fish*, *crustacea*, *insects*, *arachnids*, &c., the number of *species* being very considerable, but the number of *individuals* of each species few and scattered. The insects, and other creatures not aquatic, are found on the walls and floor of the cavern—the fish and chief of the crustacea in the waters. Now the great peculiarity which distinguishes these

cave inhabitants is that *most* of them are *blind*, and as might be expected from their living in total darkness, *without colour*. But they are not *all blind*. In the same water with the blind fish, there is another form, nearly allied to them but quite a distinct genus, which has *small black* eyes, and its body of a *dark* colour. Here is a puzzle not easily explained. Darwin's view seems to be that the blind forms have been longer in the caves than those still retaining vision. There seems, according to one observer, to have been a succession: "animals not far remote from ordinary forms preparing the transition from light to darkness. Next follow those that are constructed for twilight; and, last of all, those destined for total darkness." The blind fish, which, except as regards loss of sight, differ in no respect from the same species living at this day in the Green river *outside* the cave, are supposed, on geological evidences which cannot be entered into here, to have been *in* the cave ever since the beginning of the quaternary or postpliocene era, if not earlier. Darwin remarks that "by the time an animal had reached, after numberless generations, the deepest recesses, disuse will on the above view have more or less perfectly obliterated its eyes, and natural selection will often have effected other changes, such as an increase in the length of the antennæ or palpi, as a compensation for blindness." This last remark of course refers to crustacea and insects. But the *extreme sensitiveness* of all the outer integuments and acute sense of hearing of the blind *fish*, as a compensation for *their* blindness, is a remarkable fact which an eye-witness has testified. They are sensible of the slightest tremor or movement of the water, and feeding on other fish and crustacea they know exactly where their prey is, and at what distance, chasing and securing them with as much ease and certainty as if their eyes were perfect. Taking the facts as a whole, they lead to the belief that most of these cave animals may have been derived from other species that had migrated into the cave, ages back, from the outer world—the changes of structure adapting them to a cave life being

brought about only very gradually—in the course of thousands of generations.*

But we have blind animals nearer to us than those found in the Kentucky cave. Look at the *mole*, whose eyes are so extremely small, and so overgrown with skin and fur, that they are virtually no eyes at all. Yet the species, or its ancestors, must once have had eyes, for they are very conspicuous even *now* in the young state previous to birth, and in fact larger than in the adult, being a case of *atavism*, or a survival in part, of the characters of a pre-existent form from which our mole has been derived. What brought about the change may have been an increasing desire for worms, which is now its chief food, and which could never have been obtained in sufficient quantity to satisfy its voracious appetite without hunting them up in their own quarters. This altered habit would lead to the construction of those underground galleries with which we are so familiar; and seldom coming above ground except by accident, eyes would not be wanted, and from long disuse they would become almost obliterated as we now find them. I may add, in proof of the mole's voracity, that if shut up in a box, even after a full repast, without a supply of food, it has been said to die of starvation in a few hours.

I spoke just now of the sureness and facility with which the blind fish in the Kentucky cave, notwithstanding their blindness, regulate their movements in the water. It is a curious circumstance that the mole, which has also lost its eyes, is possessed of some instinctive faculty, by which it not only makes its way underground, but can likewise find a passage, when desired, across waters. There is a case on record, in which a mole was

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*Those who are interested in the subject of the Mammoth Cave of Kentucky and its remarkable Fauna, should consult the 5th, and one or two succeeding volumes of *Nature*, where they will find further details with Illustrations.

observed, in the dusk of a summer's evening, paddling in the water towards a small desert island in the Loch of Clunie, which it had nearly reached when secured. This island was a hundred and eighty yards from the nearest land, and surrounded on all sides by deep water. A few moles had been noticed on the island in previous years, which must have migrated, and crossed the water in like manner, to take possession of it.*

In addition to the above cases of blind animals, mention may be made of some curious little coleopterous insects, *quite blind*, found in ant's nests, where entomologists often go to seek them. What they do there, and how they ever got there; as also what use they are of to the ants, or the ants to them, are questions which I don't think have ever been answered. The ants seem to treat them very kindly and to consider them as part of their household—but whether voluntary or involuntary prisoners—their blindness is unquestionably due to their subterranean captivity over a long succession of past generations.†

Before proceeding further on the subject of alteration of structure and habits in animals, I would briefly advert to certain modern views which will help to explain what I have yet to say.

It is held by nearly all biologists of the present day, that the now-existing forms of animal life have mostly been evolved from previous forms of a lower grade of organisation; these earlier forms being revealed to us, as survivals, in the several stages of development through which the higher forms pass before arriving at maturity. These transient states, in a large proportion of the

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* *Linn. Trans.*, vol. iii., p. 5.

† See further on the subject of these insect pets Mr. Romanes' two recent works, *Animal Intelligence*, p. 83, and *Mental Evolution in Animals*, p. 185. In the former, it is stated on the authority of the Rev. Mr. White, "that altogether 40 distinct species of Coleoptera are known to inhabit the nests of various species of ants, and to occur nowhere else."

higher *vertebrata*, are passed through previous to birth; but in many of the lower animals, even in some of the vertebrated, the changes of form are not completed till *after* birth. We are all familiar with the tadpoles, in our ditches in spring, which turn to frogs, and the caterpillars, on trees and various plants, which turn to butterflies and moths. But further; many of these primitive forms of animal life exist, and are to be met with almost everywhere, which never rise to any higher form of structure. Thus, there are worms and centipedes and slugs, the two former often resembling the larval states of some insects, which never become anything else. They remain worms and centipedes and slugs as long as they live.

There are also certain cases in which the metamorphosis above spoken of, owing to the conditions of the environment, is held back and never completed;—or it is completed with the omission of one stage of it;—or it is completed prematurely;—or by a law of the species it is confined, in its full development, to one sex only. To give examples of such irregularities:—

If tadpoles are kept in confinement, with the light entirely excluded, it has been said that further development is arrested, and that they rarely turn to frogs. If frogs and toads get incarcerated in cellars or other places, where they can have no access to water at the time of the breeding season, the tadpole state is passed over altogether, and the young when hatched come forth fully formed at once.*

The same thing takes place in the newt (*Triton*), which is ordinarily born in the water, and completes its metamorphosis in that element; but young newts may often be found on land, under stones or in damp buildings and other places, from one to four inches in length and in the perfect state. These have either been born on land, and the tadpole state passed through while

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* See *Ann. and Mag. Nat. Hist.*, 2nd ser., vol. xi., p. 341, and the same vol. p. 482.

yet in the egg; or in water, perhaps shallow from the first, which has dried up, causing the gills to be cast off prematurely, and the tadpole form to cease at once.

These last cases are striking instances of nature adapting itself to external conditions, and altering its course according as these alter.

The Surinam toad may be just alluded to as a singular case in which the young are not only always born perfectly formed, but they are reared in small cells in the mother's back, in which the eggs are carefully deposited by the male, as soon as laid by the female. There they remain till they are hatched.*

We have yet to consider the case of full development in one sex only. This takes place in certain species of moth, the females of which are apterous and sluggish, nearly colourless—though the colours may be dark and well defined in the other sex, and more like great fat maggots than real moths to which, in outward appearance, they show scarce any affinity.

This form of arrested development is well seen in the females of the moths called Vapourers by English collectors,† (*Orgyia*). In some of the foreign species of this genus the females are not only apterous, with very short legs, but they actually never leave the coccoon at all, "having intercourse with the male through a hole at one end of it."‡

I now proceed to draw your attention to several changes of form occurring in the class of fish. The first relates to the remarkable difference between the young and the adult in the case of what we all well know as *flat fish*. We are familiar with

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* See a representation of this toad in *Shaw's Naturalists' Miscellany*, vol. i., pl. 17.

† Orgyia antiqua, *Steph. Brit. Ent. Haust.*, vol. ii., p. 61. Coloured figures of both sexes of this insect, under the name of Phalæna antiqua, may be seen in *Donovan's British Insects*, vol. i., pl. 16.

‡ *Entomol. Trans.*, 3rd series, vol. i., Proceed. p. 70.

the *sole* as it appears on our dishes at table, or as it lies on the marble slab in a fishmonger's shop. The two sides are different; the under side is white, and the upper coloured; and the eyes are both on the coloured side, not very far from each other. This is the fish in its adult state. What is it now when young? In this state its form and habits are totally different. Its two sides are symmetrical, equally coloured, with an eye on each side of its head; the body is transparent; it swims in a vertical position like other fishes, and is more often met with in the open ocean than near the coast. When the new form is about to be assumed, it leaves the open ocean, comes nearer to the shore, and lies mostly at the bottom where there is only a moderate depth of water. Then, as Dr. Günther—our great authority on fishes—describes it, "as soon as the body of the fish commences to rest on one side only, the eye of that side, in its tendency to turn towards the light, carries the surrounding parts of the head with it; in fact the whole of the fore part of the head is twisted towards the coloured side, and becomes as we see it."

Such is the wondrous change of form in this fish. How it is exactly effected, we need more research thoroughly to understand. But the fact itself is certain; and it is surmised further that some other fishes, also surface swimmers, and of a thin slender make, may be only the first forms of others, different in all respects, which have hitherto never been identified with them.

There are ground fishes too which seem to undergo change, not in the lifetime of individuals, but in the course of after generations. I refer especially to the "angler," so called from an upright filament on the head, moveable in any direction and terminating in a lappet, with which he plays as with a bait to entice the small fishes on which it preys. The angler is a great ugly fish with a flattened body, and an enormous gape bristling with sharp teeth; it is also remarkable for its pectoral and ventral fins, more like hands and feet, by the help of which it shifts its

place, as wanted, along the mud and weeds amid which it conceals itself, without rising from the bottom.

This fish belongs to a family in which there are many other allied forms that must have been originally derived from the angler, but which show an alteration in structure and habits due to altered surroundings. Fish that rarely leave the sea-bottom seem to have a tendency, in the lapse of many generations, to get to lower levels; and thus the anglers "have gradually found their way to the greatest depths of the ocean; retaining all the characteristics of their surface ancestors, but assuming the modifications by which they are enabled to live in abyssal depths." The angler's rod is there of no use, and other means of getting its food, and probably a different kind of food, are required.

As these last fishes are always getting into deeper and deeper waters, so—to reverse the picture—there are others that seem impatient of their proper element, and as if trying to escape from it altogether. I allude to the flying fishes, so common in tropical seas, which in certain states of weather suddenly dart out of the water—not a mere spring for a moment into the air to fall down again directly, as many fishes may be seen to do occasionally—but to pursue an aerial voyage of one or two hundred yards, rising also in some instances to the height of 40 feet. How are they enabled to undertake this long flight? By the help of enormously developed pectoral fins, very broad and equalling the entire length of the body, which must have been gradually evolved in the course of ages by use and natural selection—so at least, I suppose, Darwin would say.

And there are stranger things than these. Who would ever have thought of fish climbing trees? Yet there is a species of perch found in India, which, leaving its native element, is venturesome enough to attempt this feat. It is the *Perca scandens* of Linnæus, and is called by the natives in the Malay language the "Tree-climber." There is a paper in one of the earlier volumes of the

"Linnean Transactions" by Count Daldorff,* giving an account of this fish and its singular habits. It can move for some distance on land and even up inclined surfaces. The author himself found one "in the act of ascending a palm tree that grew near a pond. It had reached the height of five feet above the water and was still going up further when he stopped it with his hand." You will ask how the fish manages to climb in this way. It is by means of the spines on the opercle or gill-flap and the spines of the anal fin, which are all long and sharp. The fish first fixes the opercular spines in the bark of the tree, and by the help of these draws up the posterior part of the body, and then in like manner fixes the anal spines. The opercular spines are then released, and by a side movement of the head those on the other side are fixed higher up and so on; the right and left opercle taking their turns as the head is moved first to one side and then the other. What the object of the fish is in these vagaries I have no idea. It may be to get at some food it had a taste of formerly, or it may be from a sheer love of gymnastics. Anyhow, the habit must have been of long standing. What led to it in the first instance it is impossible to say, but, once formed, the spines would probably become gradually longer and stronger by use, combined with inheritance of the habit from a line of ancestors reaching back for a countless number of generations.†

But I must pass on now to speak of the remarkable case of an altered instinct, accompanied no doubt by some slight alteration of structure, which I before briefly referred to, as one in which we know almost to a certainty what occasioned it. It is the case

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* Vol. iii., p. 62, 1797.

† A doubt has been entertained by some whether the climbing of trees is a constant habit of this fish, or whether "the ascent witnessed by Daldorff" may not have been "accidental." (See Romanes' *Animal Intelligence*, p. 249.) But it could hardly so generally have got the name of the *Tree-climber* had it not been the regular habit of the species.

of a small spider, scarce the eighth of an inch long, found in coal mines. "In its natural state this spider is met with in meadows about the time of hay-harvest, and is only known as *a solitary wanderer*, making *no web* of any kind, further than a few scattered lines. In the coalpits, into which they are supposed to have been carried down originally by accident with the provender for the horses, they become gregarious and live in large colonies, constructing sheets of web of vast size. An observer is recorded to have seen one 30 feet long by four and a half feet wide, hanging from about the middle of the roof." This is a noteworthy incident.

One might almost imagine that these little spiders,—living quite independent of each other up to the time of their being carried down into the pit,—had held consultation, and come to an agreement, as to how they should meet so unexpected an emergency and carry on their lives in future. And what must have been the potentiality of their minute spinnerets, never before brought into use in this way, to render them equal to the production of such a web! It seems to hint to us what we may all do, if we only set ourselves to any required task in good earnest.

The fact which lies at the bottom of all these variations of structure and instincts such as I have been speaking of, is the readiness of nature "to grow to the situation," as I think Dr. Carpenter somewhere terms it, *i.e.*, gradually to adapt itself to any change in the surrounding circumstances of animals that is not absolutely fatal to them; as also, on the other hand, to any ingrowth of habits in the animals themselves, foreign to what is usual in their congeners or near allies.

If you doubt this statement only look around and see what is going on about you. The busy world we live in speaks every where to the existence of such changes, and often indicates in what way they are occasioned. See the effects of use and disuse on the organs of the body. Our own habits are mostly acquired in the same way as those of animals. Watch the nimbly-moving

fingers of a young lady at the piano. What facility of movement practice gives her. She has, however, to play her piece over and over again, to get the fingers to play it with effect; and she knows how soon her fingers will get stiff and unready if practice is not kept up. Look at clowns and harlequins on the stage,—or tumblers performing at a street show,—what forced and unnatural attitudes they put themselves into;—what twistings and twirlings of the body they go through with perfect ease, having been trained to them perhaps from their very childhood. If any of ourselves were to attempt such antics, it might be death to us. Look, again, at the arms of a blacksmith working with his hammer on the forge all day long; and then, in contrast, look at the lean shanks, scarcely more than skin and bone, of an old student, a recluse, who has rarely left his chair to take exercise out of doors;—see the power and large development of muscle in the one case, its wasted and shrivelled appearance in the other. And I might here draw a moral from such facts—as a lesson to ourselves, though perhaps a little foreign to our immediate subject. I might notice how imperatively nature insists on every organ in the human body being duly exercised in order to be kept in health. Use your *arms* and *legs*—your *hands*—your *voice*—your *eyes*;—exercise your *brain*, in like manner, and its thinking faculties (one of our bodily organs which, I fear, is less thought of than it deserves); if you would not have any of these organs degenerate and waste away. Exercise them all in turn, and until they begin to show signs of fatigue;—then stop.

And this warns me that it is time for myself to stop. Were I to tell you of all the "curiosities," to use Frank Buckland's word, that are to be met with in the study of animals and their ways, I should keep you here all night. Let the mere sample that I have selected for this occasion suffice; and may it have the effect of attracting more of the members of our Club to Natural History pursuits.

Do not imagine, gentlemen,—in reference once more to the case

of the remarkable insect before us,—that entomology is nothing more than collecting butterflies and beetles. This is but getting together the materials for study. We want to know all about these butterflies and beetles. Naturalists in these days must go ahead of the mere collectors of old, if they think to do anything for the advancement of real science.

Lord Selborne, in a recent speech at a public meeting,* remarked that "the constitution of England was the product of circumstances, changing from age to age as *they* changed;" and the same remark might be made respecting the constitution of the animal world. Here, too, there has been a continued succession of changes from the time of the first appearance of life on this earth to the present day—change of form, change of structure, change of habits and instincts, under the constraining influences of the earth's own changes. Nature has never stood still, and never will stand still; however imperceptible may be its changes to the men of a single generation. And it is the business of the naturalist to inquire into these changes; to work out the full history (so far as we can get it) of every living creature, and not simply its own history, but that of its progenitors as well;—to tell of the silent advance, step by step, from simple to more complicated forms; carrying back his investigations from a *kainozoic* fauna to a *palæozoic* fauna, and stopping only at the *azoic* rocks, where the geologist—had there been one in those days—might have found work in noting the gradual evolution of this earth from its first beginnings, but where the biologist—ere life had yet started into being, even in its lowest forms—would have had nothing to do.

* As reported I think in *The Times*.

The Suspension of the Penal Laws and Test, 1687-88. *By* Emanuel Green.

(Read 23rd January, 1884.*)*

After all the struggle of the Civil War, a struggle against Popery and tyranny, Monarchy was restored in 1660. In 1671, but ten years afterwards, and during the lifetime of many actors in that struggle, James, Duke of York, announced himself a Papist: a change which produced an intense agitation and also much debate about the succession to the Crown. The immediate consequence was the passing the Test Act in 1673, by which everyone holding office was compelled to take the oaths of allegiance and supremacy, and to receive the Sacrament as in the Church of England. The Duke of York, being unable to accept these terms, resigned his appointments and could only bide his time. This came in February, 1685, when he succeeded as James II. In April, 1687, having in the meantime governed without a Parliament, he on his own authority superseded the Law and abolished these Tests, which had been specially aimed at himself, by issuing what was called a Declaration of Toleration and Liberty of Conscience. By this declaration all Penal Laws against nonconformity were immediately abolished, the idea being to gain relief for his own co-religionists, the Papists. Having done this it was necessary to obtain support, or at least the appearance of it, and for this purpose every effort was made to get addresses of approval sent up from the various districts. After much labour, however, the success was but small.

From Bath, on the 25th August, "the Address of several Members of the Corporation and of other Freemen and Inhabitants," told his Majesty that after all their expressions of joy at his late visit, they cast themselves at his sacred feet, with all deference to his pleasure and undoubted prerogative in publishing the Declaration, and so they would whenever writs for a Parliament

should issue, endeavour that such persons be chosen as would readily concur with his Majesty's proceedings and this unparalleled act of clemency; and that he might have an Empire in the hearts and affections of his people, divided only with the King of kings, they would ever pray, &c.

The Humble Address of the High Steward, Mayor, Aldermen, and Capital Burgesses of the ever Loyal City of Bath, told the "Mighty Monarch" that they in all humility returned their thanks for the Declaration, and they stood ever ready for his Majesty's service, as they had shown, in defending the city against James Scot and his abettors, their loyal resolutions being then so resolutely fixed that they had resolved to die at the gates rather than suffer him to get within them.

The Presbyterians of Bath joined others in East Somerset in a general address, "in all prostrate humility" rendering most hearty thanks for thus relieving their affliction and giving new life to trade and industry.

These, as with the other effusions, were not of much weight: they contained as a rule only the sentiments of a few interested persons, who really deceived the king. Resolving to maintain his Declaration, James determined to "revise" the list of Deputy-Lieutenants and Justices; and Corporations and Boroughs were to be remodelled, so that all opposition should be removed. The Parliament prorogued in 1685 was dissolved 2nd July, 1687, and before another could be called it was necessary that its vote should be secured. Three questions were issued to the Lord Lieutenants for submission to their subordinates in their counties, to learn of any likely to be returned: firstly, whether he would be for taking off the Penal Laws and Test; secondly, whether he would assist in electing such as would vote for this; and thirdly, whether he would support the Declaration, by living friendly with those of all persuasions. So with the Boroughs, those who had interest enough to be chosen "Parliament men" were to be removed if they proved to be adverse to the proceeding.

Bath, it was reported, will not choose any but such as shall be approved by the king, "soe there will need noe change" there.

Lord Fitzhardinge and Sir William Basset had been the last members. Sir William Basset consented to all the three questions. Lord Fitzhardinge consented also, provided that the Church of England were by any way secured of being continued.

Further orders were issued for more inquiries in boroughs, and the report, made in April, 1688, by the three men who had been allotted Devon and Somerset, stated that opinions of all sorts had been discovered as to his Majesty's intentions, but the Churchmen were the great hindrance. Correspondents had been selected and appointed in all the boroughs to keep them well informed.

Bath they reported as a Corporation where the election was by the Body Corporate, who proposed to choose Oliver Nicholls, one of the Corporation; and Sir William Basset, "both right," but if the King should be not satisfied with these, others would be chosen.

In September there was again another report, Bath still adhering to the above intention.

The discontent had by now worked up an organised opposition, and overtures had been made to the Prince of Orange. Some hesitation at first would be natural, as the King having no family, by waiting a while the throne must come to him. The birth of a child in June, which everyone considered to be supposititious, entirely altered the position, and decided his action, so that by September his preparations were advanced. The Prince having publicly doubted the birth, a Proclamation in November declared the intended invasion "unchristian and unnatural in one so nearly related, especially as he calls in question the legitimacy of our son." It is clear that the birth of the P.P., as he was called (Pretended Prince), was actually the immediate factor in producing the invasion by William, as thereby his inheritance of the crown by right of his wife was forfeited and lost.

Of all the powers attributed to the Bath Waters, one, now transferred to others farther away, was that of removing barrenness in women, a belief traced as existing from an early time. An Elizabethan epigram by Sir John Harington, supposed to be relating the visit of a lady who sought this remedy, says :—

> Comely was her person, good was her feature,
> In beauty, grace, and speech a lovely creature.
> As the lady in the water staid,
> A plain man fell a talking with the maid
> Who leaned upon the rail.

This gives a peep of the usual scene at the bathing time. The intruder gathered that the lady had been advised that :—

> These baths have power to strengthen that debility
> That doth in men and women breed sterility.

The physicians took care the idea should not be lost, and notices of this power are found in their works. Dr. Sutherland writing almost two centuries later gives an account of a lady coming to the bath for lameness, who not only got her legs "but her belly up also." Acting on this custom and belief the childless Queen determined to go to the Bath, and arrived there from Windsor on the 18th August, 1687, joining the King, who had arrived about an hour before from Portsmouth. The King was accompanied by the Lord Lieutenant Lord Waldegrave, the High Sheriff Mr. Edward Strode, and others, the city "sounding with acclamations and all things performed that could in any way testify joy for their Majesties' presence." The Queen stayed at Dr. Peirce's, at the Abbey House, to be prepared as it was called. Dr. Peirce had written a notice of the effects of the waters in curing palsy and barrenness, and this being published in the "Philosophical Transactions" for 1685, was thus stamped with authority.

The example cited was that of a gentlewoman of Wells, aged about thirty or thirty-two, who had been married ten or twelve years without being with child. Being seized with palsy in the left side she was taken to Bath, where she remained some time.

After the "usual preparations," and "some internal means," she recovered the use of her hand, leg, and tongue, and not only so, but "in a few weeks after she returned to her husband, conceived with child, and had at about a year and a half distance between them, five children."

So much was this power of the waters assumed that when a childless woman arrived, the general remark was, "she comes for the common cause."

What preparation the doctor may have followed besides a course of the waters, cannot probably now be known. Abstinence was evidently one rule, possibly diet also, as Virgil's advice in the Georgics would be remembered.

The King stayed a few days at Bath, and then went northward alone. Returning to Bath on the 6th September, he again remained a few days and finally returned to Windsor alone.

The Queen remained all this time at Bath, and stayed on until the 6th October, when she also returned to Windsor.

Soon after her return it began to be reported that she was with child, and further, that she had immediately conceived on being with the King on the very day of her arrival from Bath. The future event was therefore calculated as from this 6th October. It was also circulated that at the very moment of this conception the Queen's mother was making a vow to the Lady of Loretto, praying that her daughter might conceive and have a son; the offering made being a flaming heart and two golden angels worth £60,000.

Too evidently intending to keep up this belief, the King urged the Princess Anne, of Denmark, who had miscarried, to go to Bath for her general health: to this she assented, and went there towards the end of May, 1688. Preparations were making for the Queen's delivery, all to be ready by the end of June, but no sooner was Anne gone than suddenly the Queen changed her reckoning and declared the start must be made from the time the King returned to her at Bath, viz., 6th September. Accordingly

on the 10th of June, instead of in July, no one but Italian ladies being present, the English and Protestants being away or at church, the birth was said to have occurred.

Outside it was quickly perceived that the time did not agree with the first announcement, and the child was at once set down as false. The pamphleteers had their chance, and many and curious are the issues.

On the announcement of the birth some addresses of course came up. Very few they were, but of them, two of the four from Somerset are from Bath.

The humble Gratulatory Address of several Members of the Corporation and other Freemen and Inhabitants stated that—no sooner did the happy news reach their ears than they returned praises to the Almighty for so great a blessing; a gift which the whole nation ought to esteem as the reward of Heaven, as especially following the declaration for liberty of conscience. They promised, upon their allegiance, to choose none to serve in Parliament when one should be called, but such as should give a full assurance of support, and they prayed for a long and prosperous reign, and a numerous offspring to perpetuate the royal name and even baffle mortality itself.

The hearty congratulations of the Mayor, Aldermen and Common Council told their Dread Sovereign that they thought it a duty to congratulate him, and feeling it unjust to be silent they had offered up thanks to the great Jehovah for so great a blessing; that they would be ever assisting his Majesty in his pious intentions whenever he should require it of them, and that they implored the Almighty to send more such pledges by his royal Consort.

It was in record of the birth of this P.P. that the Earl of Melfort erected, as is well known, a memorial cross in the Cross Bath, to commemorate, as the inscription told, the great power of the spring which had given an heir to three kingdoms; a fit

commemoration indeed, for it may fairly be said that this embryo of the Bath Waters cost James II. his crown.

Yet with all the apparent subserviency running through the addresses, Bath was as thankful as any place when the King was gone, and the next year had her rejoicings with the rest when the new King was crowned. One broadside poem of the time is entitled :—

The Loyalty and Glory of the City of Bath : being a True and Perfect Relation of the Wonderful Ceremony and Transactions that were lately performed there.

Another is :—

News from Bath : being a True and Perfect Relation of the great and splendid Procession, and joyful Transactions there on the 11th day of April, being the Coronation day of their most sacred Majesties, William and Mary, King and Queen of England, Scotland, France and Ireland.

In this it is told that a great number of the best quality joined in the festivities in testimony of their joy for the happy deliverance from Popery and slavery. In the procession of the day, first came a hundred young men in holland shirts, richly adorned, and carrying naked swords in their hands as a protection to the succeeding train of two hundred virgins "girt with bayonets," and clad in rich attire, with crowns on their heads and sceptres in their hands. They carried also two flags, on one, "God save King William and Queen Mary; let their enemies perish;" and on the other, "This is a Joyful Day." Next, carrying a truncheon gilt, came an "amazon dame," clad in a velvet escalloped vesture covered with gold lace, a golden sash on her waist, and on her head a light peruke, crowned with a plume of crimson feathers. Following her were twenty-four others of her sex dressed in like manner, but carrying darts and javelins in their hands; their "right paps concealed," so as to appear cut off. Next came thirty young gentlewomen having a scarf laced with point on their right shoulders and a laurel crown on their heads; each carried a bow and arrow, and on their breast the

motto: "Rather than lose the day we'll fight." Then came the militia with drums and colours and "acclamations of unforced joy," exceeding anything ever seen. After marching round the city twice all entered the Guildhall, where a "sumptuous banquet" was ready, not touched however until "by permission of the amazons." Dancing was then kept up all night, the songs being:—

> In praise of him who came, with Heaven's high hand,
> To drive Rome's priests (those vipers) from our land,
> Those locusts, that to Lucifer bespoke us,
> Whose mock-religion is a Hocus-Pocus.

The expense of this rejoicing was afterwards found to have been heavy, but "though great," it was "pleasant" on this "desirable occasion."

On Ancient Methods of Measuring Time and the use of the Ring Dial prior to the invention of Watches. By REV. PREB. SCARTH, M.A.

(Read 23rd January, 1884.*)*

The measurement of time has always been a subject of importance in every country and among every race of people. Amongst the most civilised and enlightened races we may expect to find the earliest efforts and the greatest advance in the science. We learn from Herodotus, the Greek historian, that the Greeks derived this knowledge from the Babylonians,* but the honour of the invention of the dial is also assigned to the Ionian philosopher, Anaximander,† while Pliny assigns it to his disciple Anaximines.

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* Herod. Book II., 109.

† See Diog. Laert. II. 1-3 (B.C. 547.) See also Pliny Hist. Nat., B. II., 76.

Papirius Cursor is said by him to have been the first to bring a sun dial into Rome, twelve years before the war with Pyrrus, and this was fixed in front of the Temple of Quirinus, but Varro states that it was brought from Catania by the Consul M. Valerius Massula, at the time of the first Punic War, and placed on a column behind the Rostra in the Forum.

This shows the ancient origin of the sun dial. An ancient dial is preserved in the Museum at Portici.*

Astronomical tablets have been found among the ruins in Assyrian Palaces. These are described by Mr. George Smith.† He says the summer quarter extended through the months of May, June, July and part of August. The autumn quarter begun in August and ended in November. The winter quarter extended from November to February. The Assyrian year consisted, like the Jewish, of twelve lunar months, and in order to keep it in accordance with the Solar year, an inter-calary month was sometimes added. He discovered an Astrolobe, or rather a portion of one, in the Palace of Sennacherib. In this, he says, the heavens and year are represented by the circular form of the object, and round the circumference, which was divided into twelve parts, corresponding to the twelve Signs of the Zodiac, the number of degrees was marked. Inside these there were twelve other divisions near the pole, forming a second and inner circle, and in each of these twenty-four divisions the principal prominent star was inserted.

In the Valley of the Euphrates (he observes) there were observatories in most of the large cities, and professional astronomers took regular observations of the heavens, and a report made by some of these has been discovered, and is given in his work.‡

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* See Journal of B. Arch. Assoc. Vol. xix.

† Assyrian Discoveries, 1875.

‡ Page 409.

These are supposed to be copies from still older Babylonian originals.

Layard supposes, not without reason, that the edifices, of which the Birs Nimrood is a sample, and which consist of a series of steps or terraces, were constructed on astronomical principles.* When Josephus, in his "Antiquities of the Jews," describes the sun dial of Ahaz, mentioned in II. Kings xxi. 9, he uses the words δέκα βαθμους, or ten steps, which we translate *ten degrees*, and supposes them to be the steps which measured the hours, by the shadow cast upon them by the sun light falling on a gnomon, and St. Jerome conjectures that King Ahaz may have had a dial from Babylon, as he was fond of imitating foreign inventions.

There is a Greek sun dial in the British Museum of peculiar form with the inscription ΦΑΙΔΡΟΣ ΖΟΙΛΟΥ ΠΑΙΣ ΕΠΟΙΕΣΕ. The lines marking the division of the day are very distinct.

We learn from Pliny that previous to the first Punic War the Romans had a very simple method of ascertaining the legal mid-day.

They observed the time when the sun was to be seen from the Curia, between the Rostra and the Græcostasis, and the *suprema tempestas*, which closed the hours of legal business, was announced when the sun, as observed from the Column of Mænius, was sinking towards the prison. This could only be done in clear weather, and was afterwards superceded by the sun dial.†

The Clepsydra or Water-clock was used as a measure of time by the Romans, and especially at the Races in the Circus Maximus. It is found represented on a bas-relief at the Mattei Palace in Rome, and an engraving from a gem in the possession of Mr. King, Senior Fellow of Trinity College, Cambridge, is given in the Journal of the Archæological Institute, vol. xxi., p. 138.

This method of measuring time was used originally by the

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* See Nineveh and Babylon, p. 498.

† See The Roman Forum, by F. M. Nicholls, M.A., F.S.A., p. 175-6.

Greeks, from whom it passed to the Romans. This is inferred from passages in the works of Aristotle.* The Clepsydra which stood in the Circus Maximus, at Rome, is represented on the gem as a large vase, held up by two winged boys, from the bottom of which the water is flowing. The urn, or vase, has upon it a horse at full speed.†

About two centuries before the Christian Era Ctesibius, a Mathematician of Alexandria, who had studied the principles of hydraulics, invented the *Water-clock.*

This consisted of a cylindrical vessel filled with water, bearing up a float which rose and fell with the water; and there was a vertical gauge marked with the hours; the float by its gradual ascent, as the water entered through an opening in the cylinder, showed the passing of the time.

Vetruvius describes a Clepsydra, which not only told the hours of the day, but the moon's age, the zodiacal sign of the month, and acted as an astronomical clock.‡ The mechanism of this was a great step in advance, and, as Mr. King observes, "renders it probable that the common Roman Clepsydra had a dial-face and a pointer, or hand, set in motion by a string and float, and acted like the index of our wheel barometers. In the Horologium Anaphorium of Vetruvius, the dial painted with the World and the Zodiac, was traversed by an axis on which was wound a flexible brass chain supporting by its one end the float, on the other a balance weight, equal to that of the float, as the latter rose with the water, so the balance weight descending, unwound the chain and made the dial revolve."

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* Aristotle. Problem xvi. 8.

† Cæsar mentions the Clepsydra in his Commentaries, Book V. 13, in speaking about the length of the day in Britain, and that by its measurements the nights seemed shorter than on the continent.

"Certis ex aqua mensuris breviores esse quam in continenti noctes videbamus."

‡ See Vetruvius, lib. ix., c. viii.

It is not known at what time this ancient time-keeper went out of fashion, but a water-clock was sent as a present to the Emperor Charlemagne by Haroun-al-Raschid in the ninth century* (A.D. 807).

The name *Clepsydra*, or *Lose-Water*, seems to have been succeeded by the *Horologium*, which also told the hour. This name was also given to the most ancient invention, the sun dial, and this, as we have seen, was originally a simple column, the shadow of which by its variations marked the hour.

Aristophanes noted the hour of dinner by the shadow of his gnomon, called στοιχειον, when it reached ten feet.

Pliny tells us that the Emperor Augustus "converted an Egyptian Obelisk into a gigantic gnomon in front of his Mausoleum in the Campus Martius."

This same Obelisk now serves the same purpose on the Monte Citorio at Rome.

There were two kinds of sun dial used by the Ancients, the Concave and the Convex. The former was most usual.

We are informed by Vitruvius that the Chaldeans invented the *Concave*, and Aristarchus, of Samos, the *Convex*, and also the Horizontal Dial. To Scopinus, of Syracuse, is assigned the invention of the Vertical, called *Plinthus* or *Lacunar;* one of them was set up in the Circus Flaminius at Rome.

Theodorus invented one for all latitudes, and this, as Mr. King observes, implied an extraordinary proficiency in the science.†

Having spoken of ancient classical dials and their inventors, we must now turn our attention to dials of the mediæval period.

A dial supposed to be of the Roman period was discovered at Dover, but the age is very uncertain, and it probably belongs to a much later date. A drawing of it is given in the Archæological Journal, vol. xxi., p. 262.

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* Eginheard Ann. Tranc.

† See Mr. King's Paper in the Arch. Journal, vol xxi.

On the Saxon Cross at Bewcastle a dial of that period is represented, and the date may probably be fixed to the end of the seventh century.

Ancient dials are often found walled up in churches which have undergone alteration or restoration in mediæval times.* They are of a very simple character, and seem only to have been constructed to mark the canonical hours, so that the services of the church might be regularly performed. Many of them of an early period exist in Ireland, and drawings of some are given in the Archæological Journal. At Inish Caltra, or Holy Island, in Lough Derg, in the graveyard of the old church, now in ruins, is one on the top of a slab measuring 5 feet in length by 16 inches in breadth, and intended to be placed erect in the ground. The upper portion of the stone has a semi-circle inscribed upon it, which is divided into four nearly equal spaces by five deeply-cut lines. Where these meet at the centre is a large hole intended to receive the gnomon of wood. This being shaped to a point, threw a slender shadow on the semi-circle below.

Each of the straight lines have lateral branches where they touch the circle. The hours denoted are—

A.M.		P.M.	
6	Matins.	$2\frac{3}{4}$	Tierce.
$6\frac{1}{2}$	Lauds.	5	Compline.
$8\frac{3}{4}$	Nones.	6	Vespers.
12	Noon.		

A dial of a similar structure was found in the old graveyard of the church of Kilmalkedar, Co. of Kerry; and another from the old church at Clone, Co. Wexford, has ten radiating lines marked on the semi-circle below the horizontal line.

I feel assured from what I have myself seen in different

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* See Tower of Saxon church at Bernack, Northants, and Swillington, Yorks.

churches in England, that many such dials of a remote period, with their primitive markings, might be discovered.

An ancient stone relic, supposed to be a portable sun dial, was found in an encampment in Herefordshire, near Cleobury Mortimer.

The greatest diameter is 3½ inches, and the probable date of the construction not later than the twelfth century.

Besides the hole for the gnomon it is perforated by seven smaller holes ranged in a semi-circular position round the lower portion, and by these it was intended to mark the seven canonical hours.

Portable dials, made of metal, but of a much later date, are not uncommon; several are preserved in the British Museum.

Several such dials exist in England in private hands.

A drawing of a pocket dial is given in the Archæological Journal, vol. xxxvii., p. 110. It was found about 60 years ago in Dumfriesshire. It consisted, like the one I have the honour to place before the Club, of a brass hoop about two inches in diameter, and half-an-inch in breadth, having two holes through which a string might be passed for suspension. In the centre of this hoop is a traversing hoop with a notch, moving in a groove, which could be placed at any point. At the sides of this, on the brass outside surface, in an ascending series are the letters I. F. M., in the descending D. N. O (marking the winter months). On the other side of the point of suspension, *i.e.*, on the summer half of the dial, are the letters A. M. I. ascending, I. A. S. descending. On the concavity of the ring are the markings of the hours, the space being divided into three portions, in which are the letters M. N. S. In the traversing ring is a hole for the admission of a ray of light, this by means of the notch is brought into any position under the letter and space allotted to the month of the year, and being thus adjusted to the time of the year, the ray of light tells the hour on the inner surface.

The ring dial is thus defined:—

A kind of dial usually small and portable, consisting of a brass ring, seldom exceeding two inches in diameter and one third of an inch in breadth.

In a point in this ring is a hole, through which the sunbeam being received, makes a lucid speck on the concave surface of the opposite semi-circle, on which the hour is marked and the divisions.

To make the dial available for the whole year, the hole is made moveable, and the Signs of the Zodiac, or the days of the month, are marked on the convex side of the ring.

To use it, put the moveable hole to the day of the month, or the degree of the Zodiac the sun is in, then suspending it by the little ring, turn it towards the sun till its rays point out the hour upon the divisions marked on the under surface of the ring.*

The dial exhibited has the maker's name, D. PROCTOR, above which are the letters W. H. S. The date of the dial is supposed to be A.D. 1760.†

This ancient form of dial is referred to in Shakespere, and seems to have been carried about the person as watches are at present.

Thus in "As you like it" (ii. 7.)

Jaques describes the "motley fool" in the forest—

> "Who laid him down and basked him in the sun."
>
> . . . . . .
>
> "And then he drew a dial from his poke,
> And looking on it with lack-lustre eye,
> Says very wisely, 'It is ten o'clock.'"

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* See Article on Ring Dials in Chambers's Cyclopædia, vol. ii.

† The time of the invention of watches was about 1658. Robert Hooke is claimed as the inventor of the watch, but M. Huygens disputes this claim with him. A double balance watch was presented to Charles II., which has the inscription—"Rob. Hooke, inven., 1658. T. Tompion, fecit, 1675.

See Chambers's Cyclopædia. Sub. voce.

These dials, called "Poke Dials," or pocket dials—dials which could be worn in the pocket—seem to have been common in the 16th century.*

Sometimes these dials had a bridge or axis, as well as a little ring to hang the dial or hold it up by, like that now exhibited.

Upon my inserting a letter in the Bristol *Times and Mirror*, in June last (1883), I received several communications respecting these dials.

In one from Bristol the writer says—"The ring dial in my possession is six inches in diameter, a double ring with a revolving centre-piece. One side has 14 letters on it, D. N. O. S. A. J. J. On the opposite side, D. J. F. M. A. M. J. The 12 Signs of the Zodiac, and the other side, S.D. 20. 10 A.E. 10. 20. N.D., divided into degrees. The inner side has the hours of the day and minutes also, a cycle of 90 degrees. The outer ring has 90 degrees repeated = 180, and also marked into degrees.

Another correspondent writes from Twthill, Carnarvon. He says—"I have had a ring dial for about 40 years, and as it is exactly the same as the one mentioned in the Bristol *Times and Mirror*, perhaps it would interest you to have a description of it. The description I give is from a paper written I conclude by some one supposed to be an authority on the subject," This is as follows :—"The dial shows the hour of the day in any part of the world. It consists of two flat circles from two to six inches in diameter and of proportional breadth. The outward ring represents the meridian of any place you are at, and consists of two divisions of 90° each, diametrically opposite to one another, the one serving from the Equator to the North Pole, the other to the South Pole. Across the two circles is screwed to the Meridian a thin reglet or bridge, with a cursor that slides along the middle of the bridge, the cursor has a small hole for the sun to shine through. The middle of the bridge is conceived as the axis

* See Journal of Arch. Assoc., vol. xix., p. 71, on Pocket Solaria.

of the world, and its extremities as the Poles. On the side of the outer ring are the divisions of 90° or a quadrant of altitude. It serves by placing a common pin through the hole to take the sun's altitude, from which the latitude of the place may be found."

There are no Signs of the Zodiac, nor is there any name on the dial.

The British Museum possesses four or five specimens, all of brass, and dated 17th century; these vary in size from one to two inches. The letters round the edge refer to the months, and show where the hole in the moveable ring is to be placed according to the time of year. In some cases the Signs of the Zodiac are engraved instead.

The earliest sun dials in this country are Saxon, for there is considerable doubt as to the Roman origin of that found in Dover. Bishopstone, near Eastbourne, Sussex, and Aldborough, near Hull, may be instanced as good examples. The name Eadric* is carved on the dial at Eastbourne. There is also a Saxon dial over the south porch of Kirkdale Church, in the North Riding of Yorkshire. These dials are semi-circular discs marked in the same manner as those already described, but the markings are at equal distances, which is wrong, there being only one kind of sun dial with equal divisions, viz., an equinoctial one, *i.e.*, one in which the gnomon is parallel to the axis of the earth, and the face of the dial parallel to the plane of the Equator. All other forms can be derived from these by projection, and this does not seem to have been understood until the revival of mathematics, about the time of Newton.

The finest example of a sun dial is probably that at Holyrood Palace, Edinburgh.

The only useful forms are—

1. With the face parallel to the plane of the Equator.

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* See Arch. Journal, vol. xi., p. 60.

2. With the face in the horizontal plane.

3. With the face in the vertical plane, and facing either N.S., E.W., or S.E., S.W., N.E., N.W.

The gnomon always is parallel to the axis of the earth.

For these latter observations on the construction of dials I am indebted to the kindness of Mr. Birch, who has sent me the observations of Mr. Romilly Allen, who conveyed them to him in a letter on the subject of ring dials. In conclusion, he says, that the ring dial is only an apparatus for finding the altitude of the sun and thus obtaining the time.

I may not inappropriately conclude this paper by quoting the motto from a sun dial erected at Torrington, Devon, and hope it may not be inapplicable to our present subject.

ΤΗ ΣΚΙΑ ΚΟΥΦΗ ΣΟΦΙΑΝ ΣΕ ΔΙΔΑΣΚΕΤΩ.

The Cause of Earthquakes. *By* Major Wright.

(Read February 6th, 1884*).*

The consideration of earthquakes and their causes, though happily not a subject of local interest (as would appear from some remarks in an article in the January number of the *Cornhill Magazine* it ought to be), is however one that cannot fail to have engaged the attention of most of us from the frequency and terrible effect with which these convulsions of nature have lately visited so many parts of the world. But awful as these visitations have been, there is nothing novel in either their extent or their violence. Without going back to the recorded instances in ancient history, those of the last century alone furnish us with a list of destructive shocks greater probably than those lately experienced,

though naturally events that are taking place around us now bring the matter more home to us than those of which we read and which belong to bygone times.

In all ages up to the present time men of science and learning have devoted themselves to the study and examination of these great and mysterious phenomena, and have furnished us with many and interesting theories and explanations; but it would appear that we are still very far from arriving at all the strange secrets of nature on the question; and in introducing the subject to-day I wish at once to explain that I do not intend to be one of those who would "rush in where angels quake to tread," but that my object is to invite a discussion on a matter in which I have become greatly interested, and elicit the opinions of those amongst us who possess a scientific knowledge, to which I lay no claim.

In seeking for the causes of these strange disturbances of the ground called earthquakes many people appear to me to forget the lesson taught us in the fable of the chameleon, and to jump to the conclusion that a theory which they have adopted on apparently good grounds must be the only one admissible. Now I am inclined to agree with the writer in the *Cornhill* article before alluded to, when he says, "There are earthquakes and earthquakes." It does not follow that every shaking of the ground must proceed directly from the same cause. Mr. Malet would have us believe that nearly all earthquakes are caused by subsidence of the ground which has been undermined by the gradual action of water; others assert that the cause is entirely electrical; others again consider steam to be the principal agent in the matter. While admitting that all these agencies are at times at work, and holding that one theory does not necessarily upset another, I nevertheless am inclined to the belief that in the vast majority of cases steam is the actual power that is at work and that produces such disastrous upheavals. The subsidences pure and simple I hold to be of rare occurrence; the circumstances connected with most recorded earthquakes, as well as the

innumerable shocks felt in various parts of the world, surely bear out this assertion, and it appears strange that such an authority as Mr. Malet should state as he does in a letter to the *Morning Post*, "no recorded earthquake ever took place without a subsidence." To take one instance for example, the Chilian earthquake of 1822, alluded to by Mr. Casson in a letter to the same paper, raised permanently an area estimated at, I believe, about 100,000 square miles to an additional height of three feet. In this case there would be no question of subsidence of adjacent land, for there was the sea level to go by, even had it been possible to imagine that the remainder of the American continent subsided. The same argument would apply to numberless cases where vast upheavals have taken place, naturally accompanied in some instances by a corresponding sinking of the surface in other parts. The accounts given of nearly all the most important earthquakes, ancient or modern, appear to me so clear on this point that I cannot understand how anyone can pretend to trace their origin to a mere sinking of the surface into cavities. I have never had personal experience of a really serious earthquake, but I have felt a great number of shocks, some of considerable violence, in different parts of the world, especially in Japan, where I have seen my wooden hut rock to and fro like a vessel at sea; the surface of the ground sometimes rising and falling, at others moving horizontally, and occasionally the two motions combined; yet, I cannot recall any instance in which there was any apparent subsidence after the shocks had passed. Of course there have been cases in which subsidence alone has produced a terrible catastrophe, such as the last disastrous occurrence at Casamiciola, which according to so trustworthy an authority as Professor Palmieri was a subsidence only, and though similar in its results, could in that case scarcely be called an earthquake; but even there I think it is open to question whether a slight shock did not put the finishing touch to the undermining process. If not we must disbelieve altogether the many accounts of premonitory signs,

such as the rise in the temperature of the hot springs of the island, &c.

If most so-called earthquakes are but accidental sinkings of the surface, how are we to account for all the variety of circumstances usually accompanying them, the different motions so clearly felt and tested by instruments? The volcanic eruptions, the atmospheric disturbance which though not, I admit, universal, in most cases either precede or follow the disturbance. I confess I am unable to do so; and I think we may dismiss this idea, and turn to the more generally entertained theory of electro-magnetic currents. I cannot doubt for a moment that electricity plays a very important part in these terrible manifestations, that even the solid earth may be at times as treacherous as the ocean; but I do consider that unaided by the explosive power, chiefly of steam, but possibly of other vapours and gases besides, electricity alone would not produce those mighty dynamic effects with which the world is but too familiar. Electric currents passing obstacles in the shape of non-conductors, would undoubtedly produce shocks and jars; but though on a gigantic scale, it would be natural to suppose that these would partake of the nature of those given by a battery; and the heaving and rocking of the ground must directly be the work of confined vapours, suddenly expanded by intense heat. In ordinary cases, where no actual splitting of the surface occurs, may we not assume that these natural torpedoes expend their force in bursting from one subterranean chamber to another; but that in the more serious ones such a vent being closed to them, they break out wherever the crust above them is weakest? There is apparently a great example of this in the recent catastrophe at Java.

It has been remarked that most serious cases of earthquake have not, as a rule, taken place in the neighbourhood of volcanoes: Humboldt at once explains this when he says:—"Active volcanoes may be regarded as safety-valves for the country in their immediate vicinity." And this idea seems fully borne out

by the fact that if not so serious, earthquakes are, at any rate, most frequent in such localities. At the destruction of Riomba there was no eruption of the volcano close by ; the usual openings, doubtless, having been closed up, there was no relief for the internal pressure.

The supposition that the shocks of earthquakes are in any way caused by the bursting powers of confined vapours is no new one. In fact, I find in an interesting work on the subject, written more than a hundred years, by Dr. Stukeley, which has been kindly placed in my hands by a member of our society, an allusion to those who hold what he considers this mistaken idea ; his view of the matter being that the origin of these phenomena is entirely to be traced to electricity. But, clear as his arguments are, they do not appear to me convincing, and are certainly not endorsed by the best authorities since his time. His theory appears to have been that the origin of earthquakes was to be found in electric action commencing above ground, and not in the earth below us ; and in support of this he alludes to the invariably sultry weather preceding them. I believe this to be a mistake, and though I have certainly felt what the *Cornhill* writer calls "earthquake weather" before a shock, yet I have known very many instances where there was no such indication at all.

Although the idea of the centre of our globe being a molten mass may be no longer entertained, yet all must admit that there exists great internal heat, varying in depth and intensity, but at no great distance below our feet. Science, which has told us so much about the heavenly bodies millions of miles away, has been able, for obvious reasons, to penetrate comparatively but a short way through the crust of our own planet : yet the eruptions in so many parts of the world, varying from the devastating effects of the great volcanoes to the bubbling Sulis water within a few yards of us, tell us plainly of subterranean heat : how produced who can say ? But may we not imagine this heat intensified at times by the passage of electro-magnetic currents, or possibly by some

local chemical action, and water coming into contact with it in large quantities? The sudden flashing into steam that would follow would, in a confined space, unquestionably cause a violent explosion. When a small quantity of water finds its way through a leak into a blast furnace the consequences are sometimes serious: how much greater might be the effect of a large volume of water on molten lava of considerable extent!

Though in some volcanic regions the ground, even near the surface, is much more honeycombed than I believe people in general imagine, yet I do not, of course, suppose that the vibrations felt through an extended area are produced by the passage of steam through a succession of chambers: we must trace in this the course and action of the electric wave. But that very considerable subterranean communications do in places exist there seems no doubt. There is every reason to suppose, for example, that there is direct communication between Vesuvius and Solfaterra, about thirty miles apart; the tiny outlet is evidently in such close sympathy with its great neighbour.

The undoubted fact that maritime regions are more subject to volcanic disturbance than inland districts seems to add weight to the opinion of those who assert that steam is the most potent agent in this matter, for it is easy to imagine what vast quantities of water may be ever finding its way into the bowels of the earth from the bed of the ocean, to return to the surface again only by the action of intense heat. It is not often that we have an opportunity of noticing this inpour of the sea, but a remarkable instance exists in the Island of Cephalonia, where some considerable streams, large enough to turn mills, flow continually inland from the tideless sea, and, falling into deep chasms, disappear. In the same island I descended into some of the many caverns, and when our further progress was stopped by the narrowness of the fissures, we could still judge of their immense extent by hearing the roar of underground torrents still far away below us.

This water cannot, of course, find its way back into the ocean, for were there an opening the whole of these caverns below the sea level would naturally fill. How, then, can it be accounted for? I think the steam constantly issuing from the craters of volcanoes may, in a measure, do so; it need hardly be remarked that what is commonly called the smoke of a volcano is, in reality, steam alone, except in cases of active eruption.

But it may be contended that admitting the fact of possible inpour of water on the seaboard, this would not account for earthquakes in the interior; but are there not large supplies of water apart from the seas? Are there not many instances noted of rivers disappearing, and lakes with large inpour and no apparent outlet? May there not be clefts and caverns into which water may fall in the passage of torrents through mountain gorges, sufficient to produce vast quantities of steam?

In various parts of the world there are cases of regular though intermittent eruptions of different kinds apart from volcanoes; all more or less influenced by steam. The geysers of the Yellowstone Park are amongst the most remarkable of these. But I will briefly allude to one that I have visited in Japan, which appears to me to show the result of water acting on subterranean heat without apparently any assistance from electricity or other power. At a place called Atamé, close to the coast, and at very little elevation above the water-line, there is a regular eruption of steam, followed by boiling water at intervals of four hours. Between these eruptions you perceive merely a slight curl of steam arising from the small cleft in the rocky ground; then, as the time approaches, you feel a shaking of the ground and hear a deep rumbling sound; this is followed by a noise like a mighty sobbing; then comes a furious rush of steam, and then boiling water wells out like the blood from an artery; this lasts a few minutes only, and all is again quiet. When this is witnessed at night the steam appears somewhat luminous. The water is highly impregnated with sulphur, and is used for baths by the

natives when it has cooled sufficiently. As it issues the heat is so intense that a stick held in it cracks as if placed in the fire. It would appear as if there were caverns of no very great depth or extent, but subject to considerable permanent heat: that these caverns are filled with water through an aperture from the sea, which gradually heating till it boils over, is replaced by cold water, the process taking always about four hours. If deprived of the relief afforded by the opening through which the steam and water escape, no doubt explosions would ensue. This is evidently one of those cases in which steam alone is concerned. I believe that a vast number of so-called dynamic effects might be traced to the same cause, their irregularity being consequent on the variation of subterranean heat. It is noteworthy that these disturbances are frequently repeated in the seme exact localities.

In attributing to steam the actual force in operation in most cases of earthquake, may we not go still further and imagine its having some connection with the generation of electricity?

But this is going beyond the scope of a mere glance at the subject, which is all I have attempted to take. In doing which I have simply endeavoured to form some conclusions, based on the opinions of those who appear to me to be the most reliable authorities, corroborated, to a small extent, by my own very slight experience. But I am open to conviction, and shall listen with pleasure to any observations and corrections which may be made, and which may throw more light upon the apparent causes of these abnormal conditions of what we are wont to call *terra firma*.

On a Rhætic Section near Kelston. *By the* Rev. H. H. Winwood, M.A., F.G.S.

(Read February 6th, 1884).

Travellers on the Midland line between Bath and Bitton must have remarked some many coloured beds of clay on the right hand side of the line just before reaching Kelston Station; indeed it is owing to the numerous questions that were put to me on the subject that these notes are due. Moreover, it is the duty of a Club like our own to carefully watch and record any fresh openings or sections that may from time to time occur in our neighbourhood. It is not my intention in this communication, which I have the pleasure to lay before you, to lay claim to any new discovery, but merely to place on record some details of a section which has recently been freshly opened up, and of which a description has not as yet been given in print. On the top of the bank, a few yards from the Station, some beds of white stone have long been seen cropping out, and by any geologist familiar with our locality these beds were at once recognised as those White Lias beds about which our late lamented member, Charles Moore, so often wrote, and by whose acumen their correlation with the Continental Rhœtic strata was made evident. I need only refer the members of a Club who can boast of having had inscribed on its list the name of a geologist whose fame is European, to his papers on the above subject read before the Geological Society, and found in the *Quarterly Journal* for 1861 and 1867. There the importance of these Rhœtic beds are set forth, and their existence in England first described. It was he who first separated these beds from the Liassic formation above and connected them with the Rhœtics below, and considered from the facies of their fauna and the remarkable absence of Saurian remains that if not Triassic they were certainly not Liassic, but probably indicated a transition period between the two formations, during which a gradual

change was taking place from the peculiar fauna of the Trias on the one hand to that of the Lias on the other, and that they represented (in England at least) those passage beds which are always so instructive, and to which the attention of geologists is so profitably directed. His views, though opposed for a time by those in authority, at length prevailed, and are now generally accepted, and indeed his fame may be said to have been due in no slight degree to his intimate acquaintance with these particular beds. You must pardon me if I have dwelt too long upon this point, but experience tells me that often the work of a past generation is forgotten by those who come after, and great discoveries are treated as a portion of the every-day stock of knowledge, whilst the discoverers themselves remain forgotten, if not ignored altogether.

I must now pass on to a detailed description of the Section. Owing apparently to the greasy nature of the clays forming the base of the Rhœtic beds near Kelston the north side of the small cutting there has from time to time given way, and several slips have occurred. To obviate this the railway authorities have been cutting down the bank to a more gradual slope of some 26°. This work has re-opened a good section of beds, extending upwards from the Red Sandstones and Marl of the Keuper formation to the bottom beds of the Lower Lias, and thus another locality can be added to those already described by Mr. Moore and myself, to show how persistent the presence of these clays containing a peculiar fauna are, whenever a suitable exposure takes place. So that wherever you see those remarkable White Lias beds you may feel sure that the so-called "*Avicula contorta*" shales are to be found beneath. The cutting extends in a north-west and south-east direction, measuring about 400 paces, and assumes rather an anticlinal form, the dark clays being thicker at the south-east end nearest Bath, and dying out, or rather dipping away, at the other end, so that about 180 paces only of these beds are exposed. I have visited the section

several times whilst the work has been in progress, and watched its development from time to time, and am able now to give the result of my measurements.

The rails rest upon the upper beds of the New Red Sandstone at the south-east, and at this point these beds have been exposed to a depth of 2ft. 7in. I have not found the trace of an organism in these beds, indeed it is a peculiarity of strata, coloured red by oxide of iron (such as these are) that fossils should be very rarely found. Whether this absence of organic life is due to the peculiar nature of the sediment deposited at that spot especially inimical to life, or whether this mineral has since its deposition a peculiar power of destroying all traces of organic structure I am unable to say; but such is the case, and as a rule one looks to the gray beds which occur in this formation for the presence of fossils.

This sandstone is succeeded by red marls mottled with green, about 6ft. in thickness. A remarkable band of Green Marl runs irregularly through these beds near the top; in the middle of this occurs a more or less persistent string of flesh-coloured mineral, Sulphate of Lime or Gypsum. Sometimes the regularity of the line is broken by cavities containing little crystals of this mineral, like the so-called Potato Stones in the Dolomitic Conglomerate of the Mendips. Anyone familiar with the Aust section will remember how this Gypsum occurs in the New Red there in large blocks. On top of this comes a persistent band of Greenish-gray sandy Marl, about 1½in. thick; this apparently marks the boundary of the Triassic beds proper.

During my last visit to the section, whilst these notes were in progress, I succeeded in proving satisfactorily that my supposition was correct, for this narrow band evidently represented the "bone bed" of other sections as I found a fish scale in it, and several drusy cavities where bone had been; one of these cavities evidently marks the site of a decayed vertebra, as the cellular structure of the bone can be made out on careful examination

with a lens. A sudden change now takes place, and the dark-blue laminated Rhœtic shales succeed immediately, the upper beds being ferruginous and much oxidised on the surface. Remembering Mr. Moore's discovery of Saurian remains in clays similar to these a little farther on in the cutting to the North of the Bitton Station, I searched diligently many times and requested the navvies to look out and keep any thing like a bone, but without success. Neither a tooth of fish or reptile has rewarded a careful search here, which is somewhat remarkable as the "bone bed" is generally either present itself in these sections, or else the bones and coprolites are found scattered about here and there indiscriminately in the clays. The characteristic fossils, however, occur in the blue laminated clays abundantly, *e.g.*, the *Cardium Rhœticum*, *Avicula contorta*, *Axinus*, *Anatina*, &c. Owing to the broken up and soddened nature of the beds, it was difficult at first to find traces of organisms. But, one day, on splitting open a lump somewhat drier than usual, very delicate impressions of shells appeared. This induced me to take home several lumps; these after drying to a light slate blue colour readily yielded to the knife in thin laminæ and showed a rich abundance of the characteristic fossils. The *Avicula contorta* though very rare was yet sufficiently preserved to be at once recognised. Succeeding this dark-blue shale, which in its upper portion was stained with iron, came some 6ft. of Gray Marls, with two bands of hard Marly Stone.

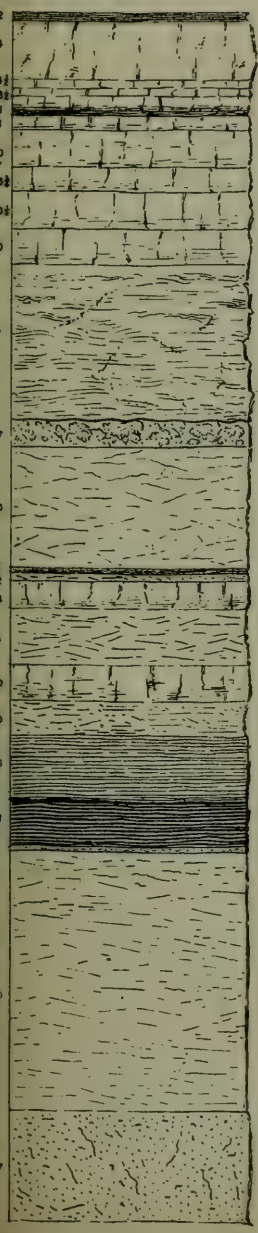
The lowest of these bands, about 10in. thick, was marly at the base, but in its upper portion dense with conchoidal fracture, indicating the gradual incoming of the White Lias conditions. Gray Marls separated this from the one above; a thin arenaceous band with patches of marl scattered here and there throughout was separated from this second bed by a parting of Gray Marl. This corresponded with a similar bed in the Newbridge Hill section, and several little shiny black particles of bone, too minute to determine, reminded one of the fish teeth and scales

obtained from the former. Grey Marls separated these beds from the Cotham Marble or Landscape Stone about 7in. thick. The upper surface especially corrugated and nodular. Above this came the rubbly broken up beds of the White Lias proper, very fossiliferous in their lower portions, containing the usual characteristic fossils—*Ostrea intusstriata*, *Lima præcursor*, *Pecten Valoniensis*, *Modiola minima*, *Myophoria postera*, *Pleurophorus*, *Axinus*, *Nucula*, &c. The Gasteropoda occur principally in casts and difficult to make out, but a *Cerithium*, *Turritella* and *Trochus* could be distinguished. These were followed by the more solid beds of the White Lias to the top of the section. Owing to the fissile nature of some of these above the two lowermost beds, and their long exposure to the weather, thin sheets easily split off and exposed some excellent impressions of shells both obverse and reverse. The *Monotis* or *Avicula decussata* was remarkable for its good preservation. The usual creamy 'Sun bed" of William Smith cropped conspicuously out on the top, and was stained a ferruginous colour on its surface, on which rested a band of arenaceous shale, containing *Ostrea liassica*, &c., indicating another change from the comparatively clear and deep waters at the bottom of which the "Sun bed" must have been laid down to those of a shallower and more rapid character. This arenaceous band invariably separates the White Lias in our neighbourhood from the grey and blue beds of the Lower Lias above. At one end of the section an exposure of about 2ft. 4in. of thin Lower Lias Lima beds came in above this arenaceous band, but the beds throughout have been so much tumbled about by the slipping of the bank, and small dislocations, that it was difficult to get a continuous section from the New Red to the Lower Lias beds consecutively, so that the measurements had to be made at various portions of the section that were most accessible. The thickness of the various beds will be found to agree in the main with the different sections of the White Lias developed in the neighbourhood, and described by the late Charles Moore and myself elsewhere.

SECTION NEAR KELSTON STATION,

FROM NEW RED MARLS TO TOP OF WHITE LIAS.

SCALE ½ INCH 1 FOOT.



FT.	IN.		
0	2	24	Arenaceous Shale *Ostrea liassica*, &c.
1	4	23	White Lias ("sun bed")
0	4½	22	Ditto, two thin beds
0	3½	21	Ditto, broken up at base
0	1	20	Thin parting of Yellow Clay
0	4	19	White Lias, solid bed
0	10	18	Ditto — Fossiliferous. *Modiola minima. Pecten. Lima praecursor, Monotis decussata. Nucula. Arca. Univalves, &c.*
0	6½	17	Ditto
0	10½	16	Ditto
0	10	15	Ditto
3	7	14	Rubly beds. very fossiliferous. *Pecten, Ostrea fimbriata, Modiola minima. Lima praecursor. Myophoria postera Plewrophorus elongatus, Nucula, Myacites, Cerithium, &c.*
0	7	13	Cotham marble or "landscape stone"
2	10	12	Greenish gray Marls
0	1	11	Arenaceous band with marly patches resting on
0	2	10	Marl
0	8	9	White Lias
1	4	8	Marl
0	10	7	White Lias graduating into Marl
0	10	6	Gray Marl
1	6	5	Blue mottled shales, ferruginous, very fossiliferous. *Cardium rhaticum. Axinus concentricus. Ax: elongatus. Avicula contorta.*
1	1	4	Black laminated shales, weathering slaty blue
0	1	3	Gray band, bone bed
6	0	2	Greenish gray Marls, ferruginous, and with manganese markings. Band of sulphate of lime near top
2	7	1	Red Marls and Sandstone

NATURAL HISTORY

Summary of Proceedings for the year 1883-4.

Mr. President and Gentlemen,

Our yearly proceedings conclude with an Anniversary Meeting on the 18th of February, that being the day on which in the year 1855 our President, the Rev. L. Blomefield (then Jenyns), together with a few other kindred spirits, founded the Club, for the especial purpose of investigating the Natural History and Geology of the neighbourhood of Bath. Since then the Antiquarian element has been added, and its ranks been opened to those whose tastes led them to the study of the remains of the past, rather than to the living and speaking records of the present, scattered so profusely around them on all sides. It is, however, a subject of much regret that the first objects and intentions of the promoters of the Club should well-nigh be lost sight of; the Naturalists and Geologists are very few, while the Archæologists are many and numerous. Can we do nothing to remedy this? I think we can. The proposers and seconders of new members might be more careful in their nomination, and impress upon their friends the necessity of showing some interest in sustaining the objects for which the Club was originally formed if they wish to join it. Then, again, a comparatively new element has crept in, represented by those who prefer the dinners and lunches to the more intellectual pursuits of the day's work. Of course the social feature is by all means worthy of being cherished, and it was with this object no doubt of cementing the bond of friendship that certain men of this sort set on foot the annual dinner, to take place after the more irksome business of the Anniversary Meeting, and to refresh and brace up the energies of their brother Naturalists and Antiquaries for the more arduous work of the coming year. It is rather a remarkable fact that at these dinners your Secretary has the pleasure of renewing his acquaintance with many members whose faces have been strange

to him throughout the whole past year, and who thus by their presence testify to their wish for the future existence and prosperity of the Club. This is well. The proceedings thus commenced with an annual dinner last year, held on Tuesday, February 20th, at the Grand Hotel, the Vice-president (the Rev. Preb. Scarth) in the chair, and the Chairman (Mr. H. D. Skrine) in the vice-chair. After the usual loyal toasts the Vice-president gave "Success to the Bath Field Club," and said he recollected the time when it numbered only four members, but now they were in a far different position. They had done good work in their existence of a quarter of a century, and learned societies were beginning to take notice of these field clubs and to recognise their value. He called upon the members to introduce young men who would take up different departments of inquiry, and carry on the task of local investigation. He regretted that the health of the President (the Rev. L. Blomefield) prevented his being present as in former years, and coupled with the toast the names of the Chairman (Mr. Skrine), the hon. sec. Rev. H. H. Winwood), and the assistant hon. sec. (Mr. Harold Lewis). Mr. Skrine, in reply, said he had usually spoken on the bright side of the question, but he felt this time he must urge upon members the importance of attending the meetings and so doing their share to carry out the work of the Club. He instanced several valuable papers which had been lately communicated, but which ought to have been better supported. At the same time he spoke with satisfaction of the work which the Club was doing and of its yearly volume of "Proceedings." The secretary also alluded to the sparse attendance of members, though, he said, other similar societies were quite as badly off. In illustration of what had been said as to the value of the work done by the Club, he reminded them that the course of the Wansdyke, so far as it ran through their district, had been traced and recorded for several places where it was now ploughed out. He gave the health of the Vice-president, who, in acknow-

ledging the compliment, said that though he had not been with the Club so much as usual during the past year, he had been practising its principles and working in sympathy with it. Thus, being in France, he paid a visit to the remarkable Roman excavations at Sanxerre, near Poictiers. He said a very fine and complete system of baths had been found there, but nothing so large as the great Roman bath at Bath. The proceedings shortly afterwards terminated. and the more serious work of the Session commenced with the

Afternoon Meetings

On March 14th. Mr. Broome continued his account of the Fungi found in the neighbourhood of Bath *(vide* page 143), and Dr. Bird communicated a paper on the Beetles of the Bath district, and a collection of the same was exhibited. After some preliminary remarks on this order of insects, and the large number of species it embraces, he spoke of their general structures—especially their nervous system—their habits, and the purposes they appear to serve in Nature ; these purposes being beneficial in some cases, but destructive in others ; dwelling particularly on the injuries they cause to garden produce and many field crops. A reference list of names was given in to accompany the collection. As, however, the correctness of some of these names is doubtful, and there are many specimens not named at all, it was not thought desirable at present to print the list in the Proceedings of the Club, but simply to indicate the chief families to which the species belong. They are as follows :—*Carabidæ*, *Cicindelidæ*, *Dyticidæ*, *Sylphidæ*, *Byrrhidæ*, *Histeridæ*, *Lucanidæ*, *Scarabæidæ*, *Melolonthidæ*, *Cetoniidæ*, *Elateridæ*, *Telephoridæ*, *Curculionidæ*, *Crioceridæ*, *Galerucidæ*, *Chrysomelidæ*, *Coccinellidæ*, *Tenebrionidæ*, *Blapsidæ*, *Melandryidæ*, *Staphylinidæ*.

The next meeting, and the first commencing the winter portion of the Session, was held on Wednesday, Dec. 12th, Mr. Skrine in

the chair, when the PRESIDENT (Rev. L. Blomefield) read a paper on the "Capture of a Rare Coleopterous Insect near Bath."

Before commencing a description of this insect he reminded the members present that it was now twenty-eight years since he instituted the Club for the investigation of the Natural History, Geology, and Antiquities of the neighbourhood, and that it was with regret that he observed that natural history was not so actively taken up as he could wish. It was with a view to stirring up the members in this department that he had prepared these notes on the capture of this rare beetle. Taken near Bath in September last, it was one of the Cerambycidæ living upon timber, found all over Europe, but rare everywhere except in Sweden, where it occurred in old boats and trees.

Mr. SKRINE returned to Mr. Blomefield the thanks of the Club for his very remarkable lecture, and stated that though the Antiquities of the neighbourhood might be exhausted, not so the Natural History, of which more wonderful things can be told than of any other things. As to the object of the antennæ, he suggested they might have been used for tapping the bark of the trees or for converse. Bees and other insects have their method of converse one with the other—were these antennæ means of speech?

Mr. Williams's "Remarks on and exhibition of fossils, &c., illustrating the bed of the sea," were postponed to a future meeting, as the limited time at his disposal would not have been sufficient to admit of justice being done to his subject.

The second afternoon meeting was held at the Literary and Scientific Institution on Wednesday, January 23rd, but the attendance of members was anything but complimentary to the two gentlemen who had come from some distance to read their papers—the Rev. Preb. Scarth from Wrington, and Mr. Emanuel Green from London. In the absence of Mr. Skrine through illness the chair was taken by the Rev. Canon Ellacombe, of Bitton, and there were present Colonel Cockell, Dr. Mantell, Dr.

Norman, Messrs. Allon Tucker and Wilson, one visitor and three ladies, the treasurer and secretary, *i.e.*, eight out of 83 members!

The subject of Mr. GREEN'S communication was "The Abolition of the Penal Laws and Test, and the Declaration of Liberty of Conscience: a Somerset Episode of 1688." Prepared with his usual care and accuracy, the paper was the result of his researches among hitherto unpublished MSS., and owing to the extent to which the matter had grown during his investigation the reading was necessarily much epitomised, the parts relating to Bath only being noticed *(vide* page 195).

The CHAIRMAN, whilst thanking Mr. Green for one of his valuable local sketches, contributing so much to the making of the general history of a country, pleasantly excused the smallness of the audience, partly from the severity of the afternoon's storm; and then called attention to the source whence the writer had drawn his materials, remarking how such apparently dry subjects as the legal Test Acts, &c., could be made interesting, and brought home to us by such local papers as these. The actors in the scenes of the present, little realised how they were each in their several ways contributing towards the history of their own times.

Mr. SCARTH then read a paper on "Ancient Ring Dials and Methods of Measuring Time." This subject, he said, had occurred to him as likely to interest the members from the fact of a brass ring dial, which he had the pleasure of showing them, having been placed in his hands by a neighbour for explanation *(vide* page 202.)

In the discussion which ensued the CHAIRMAN alluded to the wide range of the ruder methods of measuring time described in the paper—a range extending beyond that of the civilised Greeks and Romans into the regions of barbarism, when high trees served as indicators of the time of day. Several passages from Shakespeare and Charles Lamb were quoted, in which allusions to ancient forms of dials were made. These pocket dials were familiar also

to the Tyrolese and the inhabitants of the Pyrenees. 1658 was given as the date for the origin of watches. Dr. Mantell mentioned that water clocks made of a tin can were still used in Bengal.

The SECRETARY, in the absence of the Rev. W. T. Blathwayt, read the notes sent him on the "Martel de Fer." From these it appeared that this axe was found in a stone coffin at Langridge, near Bath, about the year 1788, by the Rev. G. W. Blathwayt, the then rector, in whose family it has been ever since. A spur, since lost, was found in the same coffin. The "martel" was shown to Mr. Planché at Langridge when the British Archæological Association visited Bath in 1857. He said the ornamentation is undoubtedly Oriental, a trophy, it may be, brought from the Holy Wars and buried with the Crusader as one of his most valued weapons. He said it was very difficult to give a precise date to it. The leather covering of the handle is modern. With regard to the apparent existence of a hinged cover at the butt-end of the silver mounting, the CHAIRMAN said that there was a "martel de fer" in the Tower armoury with a covered opening at the butt containing space for a pistol. That was of Elizabethan date. As to the derivation of the word "martel," he said it had the same root as the word "maul," as in the expression "he was very much mauled," *i.e.*, knocked about; also in the "Mall," in "Pall Mall." The Latin "malleus," hammer, was cognate also. He thought the "martel de fer" exhibited was used by retainers more for the purpose of breaking open the armour than for that of killing outright.

Mr. SCARTH, who had been present at the meeting of the Association at Langridge, remembered the circumstance, and said that the burial had been a secondary one evidently, so that this weapon was not of the same date as the original interment.

The fourth and concluding afternoon meeting of the Session took place at the Royal Literary and Scientific Institution on Wednesday, Feb. 6th. There was a good attendance of members

to hear Major Wright read a paper on the "Cause of Earthquakes," which though not a subject of local interest, he said, in spite of some recent remarks in the *Cornhill Magazine*, yet their recent occurrence has brought the subject home to us. (*Vide* page 212).

The CHAIRMAN, whilst thanking Major Wright for his paper, said that once during a ride the only indication that he had of the action of an earthquake then in progress was the bowing of the heads of the trees to one another. Neither his horse or himself were affected by it.

Mr. TIMINS, Major MENARS and Mr. MCMURTRIE joined in the discussion afterwards, the former stating the fact that coast-lines were generally the seats of disturbance tends to support the steam theory. The latter also thought that theory the most reasonable, and with reference to the recent calamity in the Straits of Sunda, reminded the members of the statement so often made, but rarely accepted, that the workings of Nature in past ages and in the present are identical.

The meeting was concluded by a paper from the Secretary on a "Rhœtic Section at Kelston." Mr. WINWOOD said that travellers on the Midland line could not fail to notice the many-coloured strata recently exposed in the cutting near Kelston station. His attention having been called to this by several friends, he thought a description of the beds would not be unacceptable to the members (*vide* page 220).

Mr. MCMURTRIE and others took part in the conversation afterwards.

EXCURSIONS.

Maesbury and Gurney Slade.—The quiet little station of Maesbury saw a large party of the members assemble on the platform on Tuesday, April 24th, from the 9.57 train. The Mendip hills are always attractive, and on this occasion their charms failed not to exercise their influence, notwithstanding the almost exclusive

geological aspect of this, the first excursion for the season. Maesbury Castle, Gurney Slade Dyke, and Emberrow Lake was the programme, with Mr. McMurtrie for geological instructor, during the expedition. The day promised well at starting, and though there were certain indications that the snowstorms of the previous day might be repeated, yet the sun shone out during the journey up; and when the party commenced their day's work in the railway cutting, a cold wind, with bright sky, foretold a bracing ramble. The first point in the day's work was to examine the Lower Limestone Shales, and, if possible, find their point of junction with the Old Red Sandstone below. The Shales, as is always the case, were found to be full of organisms, and once must have teemed with life. Brachiopods and Crinoidal remains abounded, and the surface of one large slab was seen to be covered with those branching impressions in relief which are now causing a brisk passage of arms between certain geologists as to their nature—whether they are to be attributed to the animal or vegetable kingdom, *i.e.*, whether they are the markings left by worms on the ancient mud flats of the period, or are the impressions of seaweeds which once flourished in those times. Mr. McMurtrie having described the section and brought the party to the top of the watershed towards the junction of the Shales with the more solid beds of Carboniferous Limestone (which junction, however cannot be actually seen here), returned towards the station, sought in vain for any trace of the Old Red Sandstone *in situ*, and then struck the road on the south of the camp. A scramble over a stone wall and a stiff ascent landed the party at the south-west corner of the fortification. Traversing the vallum a halt was called at south-east end, near the pole placed by the Ordnance Survey, and whilst the members enjoyed the fine and extensive view the Secretary briefly recorded what was known of the camp. Expressing a regret that Mr. Scarth was unable to be present, he stated that it was of oval form, and one of those pre-Roman camps which

abound on these hills; it had two entrances, one on the north-west side, the other on the south-east, with a deep ditch and two outer ramparts, strengthened especially at the north-west entrance, the weakest point. The Roman road to Sarum passes it on the north, and doubtless this camp, like others of the same character, had once been occupied by the Romans, though he believed evidence of Roman occupation had not as yet appeared. Excavations alone could settle the point. Having stated that Black Down, away to the north-west, was the highest point of the range, being 1,067 feet, whereas this hill was only 979 feet above the sea level, he drew attention to the extensive view, embracing the Palæozoic ridge of the Quantocks on the south-west, the Oolitic plateau of Lansdown on the north-east, and the Greensand heights of Stourton on the south-east, whilst in the middle ground appeared the Liassic Tor of Glaston and the knoll of Brent. The Secretary then called on Mr. McMurtrie to describe the geological features of the neighbourhood. Maps and diagrams were spread out on the vallum, and the chief peculiarities of the strata explained. The members were standing, he said, on the axis of the Mendip hills, on a ridge of Old Red Sandstone, and though they were unable to see any quarry section of these beds, yet the ground was covered with blocks of Old Red sufficient to indicate the nature of the rocks below. The Mountain Limestone dipped away north and south from this ridge, and upon their upturned edges the Secondary beds, ranging from the New Red Sandstone, through the Lias and Oolites, were deposited horizontally. As to the question of the cause of the disturbance which formed this anticlinal ridge, he pointed out on the diagram a great mass of igneous rock, which in his opinion (though he knew Mr. Winwood differed from him on this point) burst up through the centre and caused the disruption and tumbling about of the beds. A vast amount of denudation had taken place, sufficient to carry away many thousands of feet of superincumbent strata. Evidence of this

might be traced in the Conglomerate composed of many of the older rocks of that period which fringed the slopes of the hills, and in the planed down and levelled tops of the Limestone beds, and the infilling of the fissures in those beds by a deposit of the subsequent Liassic waters. Many other matters of detail were gone into, and various questions, showing that the members were quite alive to some of the difficulties of the science, had to be answered before Maesbury was left for Gurney Slade. On the way some good exposures of Limestone were visited, and hammers busily at work in detaching the corals and encrinital stems standing out sharply on the weathered faces of the rocks. The Gurney Slade Dyke was examined, and Mr. McMurtrie here shortly recapitulated what he had already given to the members at one of their afternoon meetings, and is printed in the "Proceedings" recently published. The Secretary expressed a doubt as to the red band running down the dyke being New Red Sandstone as was therein stated, but the otherwise accuracy of the section given was undoubted. About this time of the day some refreshment seemed to be urgently needed by the party, and mine host of the Old Down Inn had provided a substantial cold lunch which was very welcome. After lunch the Rhœtic section, near Lynch House, was visited, the Dolomitic Conglomerate followed to its junction with the New Red Marl and the Rhœtics in the road section. Here a halt was called, and hammers at work again, disinterring the teeth and scales from the bone bed which here and there crops up in the bank. Thence a detour through a winding and pretty valley to the Emberrow water, passing on the way a *swallet* hole, down which a stream disappears through the cavernous recesses of the Limestone, to re-appear some distance below. The Millstone Grit was here sought for, and found just before reaching the water, and Mr. McMurtrie pointed out the spot where former trials for coal had been made. One conspicuously marked in the centre of the water by a small island with rushes growing on it, the other an adit driven into the bank

through coloured Shales and Sandstones (query Coal Measure Sandstone or Millstone Grit ?) The botanists appear to have found little to reward their research, owing to the extreme lateness of the season. By this time the members began to feel the necessity of a little respite from the mass of geological details which had been impressed upon them, and leisurely strolled by road and field to the Binegar station *en route* for Bath.

Brent Knoll.—The excursion to Brent Knoll on Tuesday, May 2nd, was evidently attractive, as a larger number of members than usual turned out of the 11.59 train at the small station of Brent. After a dusty and hot walk of about a mile the party was hospitably received by Archdeacon Fitzgerald at his pretty vicarage of South Brent (or Brent Knoll, as now called to prevent confusion with South Brent in Devon) and conducted into the garden, where tiger, grizzly bear and panther skins (the latter very fine, measuring some 8ft. in length) were enticingly spread out on the grass. But the work in prospect admitted not of such inviting repose, and the Church close at hand was at once inspected. Entering the south porch and passing through a Transition doorway into the nave, the members recognised the usual type of the Somerset Perpendicular in the lofty piers separating the nave from the north aisle. Consisting of nave, north aisle, with a chapel on the south now used as a vestry, and a chancel, of which it will be sufficient to say that it was built about fifty years ago, the Church has many features of peculiar interest. A fine wagon roof, of which the ribs are ancient—the intermediate woodwork having supplied the place of the pre-existing plaster—spans the nave ; a very fine old Perpendicular roof, with its massive bosses, covers the north aisle, at the east end of which, and attached to the wall, is a Transition pillar and support for a piscina. In the chapel to the south of the nave the cusps of the inner arch of the west and south windows are similar to those at Bitton Church, the work of Button, Bishop of Wells, and contains a credence table and piscina. The bench

ends in the nave are carved in the usual fantastic style of Henry VII. period—here is a monkey at prayers, here a fox preaching to geese in the garb of a Bishop probably, with a mitre and crosier in his right hand with the crook turned outwards—caricatures whereby the ecclesiastical animus of the period was displayed. Two. monuments attracted attention, one a simple white marble slab, to the memory of the Rev. Joseph Ditcher, deceased, 1859, the other a sumptuous and obtrusive many-coloured mass of stone and plaster, erected to the memory of one John Somerset, 1663. A font of the Decorative period with quatrefoil bowl, and the fine Perpendicular western doorway with canopied niches on either hand, were noticed, and then the members wended their way up the Brent (steep) Knoll by the north-east corner of the Church, whence the best view of the fine tower and north aisle is obtained, forming a charming point for a sketch, but unfortunately not suitable as regards light for the photographer's art. Before leaving the churchyard the Archdeacon's daughter brought some specimens of the wild flowers of the district—the purple gromwell and the water violet *(Hottonia)* considered rare. Up the winding ascent to the north of the Church streamed the members; white umbrellas here and there, indicative of the great heat of the sun, were conspicuous. View upon view of the distant country gradually unfolded itself, until the whole grand panorama spread out at their feet when the members reached the summit. Here the Archdeacon pointed out the distant objects. The Quantocks and Blackdown hills in the hazy distance to the south, with the Polden hills and Mendips stretching away to the south-east and east, the middle distance filled in by the towns of Highbridge and Burnham, then to the right Minehead, the Severn sea, distant Welsh hills, Steep and Flat Holms to the north; and the background supported by Brean Down and the Western end of the Mendips; the three monuments of Wellington, Pitt and Hood just discernible for those who knew where to look for them.

The Secretary then took up his parable, and with the geological map spread out on the grass, spoke of the geological features of the district. Alluding to the Mendip hills, which formed the base of the Bristol and Somerset Coal field, they were now, he said, standing to the south of this, with the ancient barrier of these hills shutting them off from that field, but might not another roll of these Coal Measures be lying beneath their feet between the Quantocks on the south, and these hills on the north? Possibly: but if so it must be won at a great depth, for the Secondary formations on the south side where they were standing were of much greater thickness than the same on the north; the Triassic, Liassic and Oolitic rocks being estimated by thousands on this side instead of by hundreds of feet on the other. With regard to the Knoll on which they were standing, some 475 feet above the sea level—having passed from the alluvial plains of the Moor, they had gradually walked over the Lower, Middle and Upper Lias beds, forming platforms discernible from a long distance, until they reached the main mass of the Knoll itself, which consisted of the Midford sands, capped by a small exposure of the Cephalopoda bed of the Inferior Oolite according to the recent survey. Glastonbury Tor, which they could see in the distance to the height of 500 feet above sea level, was of similar formation, but capped only by the sands. Both were once islands in the ancient seas, and bore traces of great denudation; indeed should there be a rise of the tide from any unforeseen cause, to the height of some 20 feet above its ordinary level, the whole Moor might even now be covered by the sea water as it was formerly, and the various knolls seen rising as of yore islands from the mass of water. Before descending, attention was drawn to the state of the ground on top of the camp, pitted all over with irregular hollows, apparently the result of quarry explorations for stone. Query, whence came the lower Lias used in the churches on either side of the knoll? Not from here of course, but from some beds lower down in the formation.

Tradition speaks of Watchet as the place whence the stone came for South Brent Church. Tradition also speaks of Roman coins having been found in this camp on the top—possibly—but the form is evidently pre-Roman, and must therefore have been occupied subsequently by these people. Easy was the descent from the top to East Brent ; a small knot of the junior inhabitants of that village had been intently watching the party, their intentions were now evident, as they were seen scampering down the hill as Archdeacon Denison's skirmishers sent to warn the latter of the enemy's approach. That venerable man, whose climbing days, as he said, were over, was in readiness at the foot of the hill, and with his usual warm greeting to all who come within his ken, welcomed the philosophers ; report had reached the latter at the railway station that he had, with his usual forethought, provided fifty bottles of soda water in anticipation of their thirsty propensities. The party at once yielded themselves up to his cheery guidance, and felt that they were in the hands of one accustomed to command. After a most hospitable reception by Mrs. Denison at the Vicarage, and partaking of a lunch the very model of what a lunch should be to a party of hungry pedestrians, they proceeded to visit the water works, with which his name will be long associated. The rather complicated series of reservoirs, springs, dams, taps, filtering beds and pipes were fully explained. The supply of pure water obtained from the hill was not only conducted to the Vicarage, but the whole parish also benefited by its use, so that instead of the villagers drawing water from the same watercourses which carried the sewers as heretofore, they had now an unfailing supply of the purest water brought to their doors, and thus was increased the health and happiness, and, it is to be hoped, the gratitude of the inhabitants. After looking at the tanks and the fish-hatching house in the Vicarage garden, the Archdeacon showed them over the Church, similar in structure to that of South Brent, consisting of nave and north aisle, with mortuary chapel on south. The three

old *grisaille* figures in the east window of the north wall were especially admired, and the whole series of figures in the windows of the north side had been restored in modern imitation glass. The treatment of the Crucifixion in the east window of the north aisle, temp. Henry VII., was peculiar; a man blind in one eye was represented pulling out the spear from our Lord's side. The coronation of the Virgin by the Father and the Son, the only piece in the window preserved in its original state, was also remarkable. Amongst other things to be recorded were the remains of the shrine of the Virgin in the north aisle, the peculiar Jacobean plaster roof of the nave, more curious than beautiful; the curiously-carved bench ends and the narrow shelf in front, not for a book rest, as generally supposed, but as the Archdeacon suggested, most probably used for kneeling upon, so that the high altar might be more easily seen during the Elevation of the Host. The seal of Glastonbury Abbey was carved on one of the bench ends. Before leaving the churchyard a view of the tower was taken from the best point at the south-west end, and a discussion ensued as to the age of the fifth storey. The Somerset towers consisting generally of four only, was this fifth storey original, or was it a subsequent addition to carry the spire, which before Burnham Lighthouse was built served as a mark for sailors in the Channel, and was painted white by the Government every twenty years? Some were of one opinion, others of a contrary. There was also a noticeable feature about the carrying up of the angle buttresses. The west front of the tower was adorned with three niches, containiug figures of the Virgin, to whom the church was dedicated. the Father with the Son in His bosom, and the Saviour in Glory. Time was running short, and a hasty visit only could be paid to the top spring of the reservoir. The discovery of the old miller's spring was described by the Archdeacon, the subject of the divining rod discussed, and his genial face was last seen at the stile, where after due thanks given to his lady and himself for their courteous reception of the members,

they parted from him, the echoes of one of his characteristic stories still ringing in their ears.

Stonehenge.—The morning of Tuesday, 26th June, commenced with heavy showers and dark clouds, but in spite of the threatening weather about 20 members were at the G.W.R. Station for the 8.51 train to Salisbury. After a pleasant ride, the party arrived at their destination about 10.30, and proceeded at once to the Cathedral. After admiring the grand proportions of the nave, the members obtained the kindly assistance of a verger who conducted them round the choir, and pointed out the principal monuments, stained glass windows, and other objects of interest. The cloisters and chapter house were visited, and in the latter the curious figures representing Old Testament History from the Creation of the World to the Journey of the Israelites were examined and explained. Its position is probably unique, being, unlike some other Cathedrals, situate in an open space, so that it is seen to its best advantage.

The next attraction of interest was the well-known Blackmore Museum, adjoining the South Wilts Museum. The latter was first inspected, and contains many matters interesting to the geologist and antiquary. Not the least remarkable is a tall figure of S. Christopher, which, with the curious animal also shown, is carried through the streets of the town on special holidays. The Blackmore Museum, founded in 1863, contains specimens of ancient arrow and spear heads, and pre-historic remains. However, the time was limited for the visit which might well have been extended, and the Club proceeded to the Cathedral Hotel where "mine host" had prepared a capital repast which was not neglected by the hungry travellers. At 12.30 the breaks started from the door of the hotel, and after about 20 minutes' drive Old Sarum was reached. Passing through the Old Castle Inn the steep face of the hill was climbed to the summit fenced by a vast earthen rampart and ditch. The area within is an irregular circle; in the centre is a second circular

earthwork and ditch, very nearly as high as the outer rampart, this was the site of the Castle or citadel; it is now thickly overgrown with bushes, but some portions of a strong wall on the crest of the hill are still to be traced. There were entrances to the great outer work on the eastern and western sides. Although it is known that the stone from Old Sarum was greatly used in the building of Salisbury, and more particularly in the Tower of the Cathedral, it is astonishing to find so few traces of the old Norman City. On returning to the Inn the landlord showed a skeleton of a man which he had discovered some few months ago; it is in most perfect preservation, the only fault seeming to be a fracture of the hip bone; it was found imbedded in the Chalk about a foot below the surface. The heavy rain which fell during the stay at Sarum caused the party somewhat to lengthen its stay, and on resuming the journey the members were so much occupied in keeping off the wet that they somewhat missed the beauties of Ambresbury or Amesbury, and only saw the exterior of the old Norman Church, *en passant*, and Vespasian's Camp. However, the rain began to abate as Stonehenge came in view, and the breezes of the plain were very enjoyable. Stonehenge appears at first view to strike one as disappointing, and it is not until the visitor gets close up to the stones that he is struck with their immensity, and wonders, as thousands have done before him, which of the many objects that antiquaries theorise upon for placing such a pile there is the true one. A description of Stonehenge is not required here, as there are so many elsewhere with supposed restorations, which become so familiar that one seems hardly to recognise the stones in their present situation. However, an intelligent old man helped us to trace the various circles as they were supposed to exist.

Some of the members wandered off to the barrows and for an inspection of the Cursus, concerning the origin of which there has been so much speculation, and when sufficient time had been spent there, we wended our way over the downs, and through the

pleasant village of Wylie to Wilton. Some went to see the new church there, erected by the Herberts, at a large cost, from a foreign design The different kinds of marble in the interior of the building make it very beautiful. The station was then sought, and the members reached Bath about 6.30, after a pleasant and agreeable day.*

The Forest of Dean excursion for August 21st was postponed at the quarterly meeting of the Club, held on July 3rd, and it was proposed to join the members of the Somerset Archæological and Natural History Society, who met on that day at Wiveliscombe ; but notwithstanding that the members of the Bath Field Club were, by a special resolution of the committee of that society, granted the privilege of joining the excursion free of expense, yet there was not any response to the notice issued to the members, and the Club was only represented there by the Secretary.

Bye-excursion to Blandford and Hodhill.—The bye-excursion arranged for the 3rd and 4th of July to visit some of the Dorsetshire camps, was, for some reason, very badly attended, the Vice-president, Secretary and two other members alone representing the Club on that occasion. This was the more to be regretted as the Dorset Natural History and Antiquarian Field Club had a special meeting for the purpose of joining the Bath Club on the 4th, due notice of which was given in the printed forms issued to the members previously. The Midland Station was the place of starting for Shillingstone, where a break was in readiness to convey the party to Ranston, the residence of Sir Talbot Baker, and close to two of the camps which were the object of the excursion. After a hospitable reception and a hasty glimpse at some of the pictures (a beautiful family portrait, by Gainsborough, in the drawing-room, attracting especial attention), Sir Talbot led the way through his grounds, shadowed by the foliage of some fine witch elms, copper beeches,

* For the above notes the Secretary is indebted to Mr. Allon Tucker.

and a magnificent cedar of Lebanon, to the foot of Hamildon hill. Gradually ascending the sloping ground after crossing the stream of the Iwerne (pronounced Eworne, or Youworne), fine views of the surrounding country opened out anticipations of the magnificent panorama seen from the top; Lord Wolverton's modern house standing out conspicuously on the right, and the villages of Iwerne Minster and Courtney nestling snugly in the valley below. Before reaching the main entrance to the camp on the south-east several low defensive lines were crossed, and then came the chief outworks, consisting of four high ramparts with their ditches, the interior one the highest of all. Winding their way in through these, a sloping way was seen leading off to the north-east, down the hill, under cover of the ramparts, supposed to be the water-way for the defenders, as a well of water either existed, or was known to have existed, below. Crossing another defence, which appears either to have divided the original camp, some three-quarters of a mile long, into two parts, or else indicated the presence of a later portion subsequently constructed, the highest point of the interior was reached—some 500 feet above sea level. Standing here with the "Giant's Grave" (a long barrow in front), with Mount Silver on the left, hiding the Quantocks, a wide extent of country stretched away to the horizon; the Vale of Blackmore, formerly called the Forest of White Hart, Melbury, Shaftesbury, with the great Chalk Down range to the north-east; then at the back, looking in the direction of Wimborne, the white cliffs of the Isle of Wight were even visible in the far horizon. All these places were pointed out by Sir Talbot Baker. Whilst just below to the north-west, at the village of Child Okeford, he told us once dwelt William Kethe, versifier of the 100th Psalm (O.V.) But as to the camp, who made it? Extracts were read from Coker—"Survey of Dorset"—written c. 1615, who inclines to the belief that it was the work of the Britons, and from the Magna Britannia, giving a description of it, and attributing it to the Danes; but since that time more

correct views of the origin of these were held, and the better received opinion of such men as Warne and others was that they were made by the natives for defence against the inroads of the bordering tribes, or of their foreign enemies; and that the Belgæ had made the one in question, and took refuge here from the attacks of the Durotriges dwelling on the other side of the Stour. Retracing their steps by the way they came, the party were conducted across the slopes of the down to the south-east, and after descending a steep valley, commenced the ascent of Hod hill. Hanford house was seen, beautifully embosomed in trees below on the right, and some cheery young voices, whose sound had reached the party on the side of Hamildon hill, were seen on the sky line above, ready to welcome the strangers, or may be to poke some fun at the old fossils who came so far to see such ordinary banks of earth. However, on this occasion more interest than usual seemed to have been taken by the visitors, as evidenced by their intelligent questions in listening to the admirable description of Sir Talbot Baker, as he drew attention to the features of the camp, pointing out the difference between the original and larger camp, including the smaller one inside it. Entering the latter at the north-west corner and following the line of the second and inner of the two north ramparts, he said there could be no doubt that they were looking upon two different kinds of work—a Roman and a pre-Roman—the former being contained in a part of the latter. The north-west corner of an ancient pre-Roman camp, of some 50 acres, following the irregular form of the hill, had been converted into a parallelogram or square, in Roman times, by running straight lines of defence from side to side, and thus enclosing a rectilinear space. Not only did the form of this smaller camp indicate its origin, but up to 1853 the site of Roman habitations was plainly visible in the interior, and many Roman remains had been found there. These were the times when the plough had been so busily at work there, and been the means of enriching Mr. Durden's museum at

Blandford with so many treasures. The peculiar low broad space between the inner and the outer ditch, on the east side, indicated that the defenders trusted more to mechanical means of defence than to the height of the ramparts, for this was probably the platform for their engines of warfare, their ballistæ, &c. The entrances, too, were of different shape, and had places for slingers on either hand. The water-way leading to the Stour, which washed the foot of the hill on the west, the numerous round depressions on the south and south-east side, marking the probable site of the hut circles in the older camp, and the well-defended east entrance of the latter, were all visited. And special attention was called to the numerous pits or scoupings visible along the slope of the ramparts, both outside and inside on the north and south side of the camp, and their origin and uses discussed. One, somewhat larger than the others, on the inside of the south rampart, was stated by one of the lady visitors to have probably served for the tent of a chief officer. This might be; or was it merely the result of the excavations when making the ramparts? After a delightful and instructive ramble, Hod hill, its camps, butterfly orchids, and fresh breezes were left, Sir Talbot thanked for his able guidance, and the members rolled away through pretty scenery and past Bryanston house to the Crown Hotel at Blandford—not, however, before they had visited Mr. Durden's collection of Neolithic flint weapons, bronze hatchets and torques, Roman swords and fibulæ, Saxon enamels, and many priceless local treasures which his genius and energy had, during a long life, collected together and admirably arranged. Mr. Shipp's collection of local fossils was inspected as much as the now waning light allowed, and some remains of Elephas, from the Mammalian drift near at hand, especially noted, and thus terminated the first day's excursion, one of the most instructive and pleasant of the season.

An early start was made from the Crown, Blandford, the next morning at 9 a.m., to visit the other camps in the programme for

the two days' excursion. Before, however, leaving Blandford, a slight detour was made to see an old house in the town, belonging to Mr. Luff, of late Elizabethan date. It was built of red brick, and carried two elegant chimney stacks, ornamented with round terra-cotta pilasters; these were so placed that all the flues of the house passed up into them, and instead of being, as is usually the case, a disfigurement, were an ornament to the roof. The rooms were loaded with curiosities of every description, china, pictures, and bric-a-brac met one at every turn, and instead of the few moments allowed for their examination, would have required days. The time did not, however, admit any further delay, and again, under the guidance of Sir Talbot Baker, the party passed over the downs and between some tumuli to Buzbury camp. This was not of such interest as to cause a long delay, a walk round showed it to be a circle within a circle, and probably constructed at two periods. Considerable space intervened between the outer rampart and the inner one. It was considered to be about the same age as the others recently visited. Regaining the carriage, a new road across the down was followed to Rushton. Before entering the village the small stream of the Tarrant was crossed—hence the origin of the many "Tarrants" in the valley applied as prefix to the villages. Before visiting the church the Rector's geological collection was inspected, and many local fossils worthy of notice, amongst them the baby tooth of an elephant, or the tooth of a baby elephant, from the gravels of Blandford S. Mary, probably the same place whence Mr. Shipp's mammalian remains came; a good specimen of the stem of a tree-fern, from the upper greensand of Shaftesbury, originally called *Protopteris punctata*, now *Caulopteris punctata*, and figured in the *Geological Magazine*, vol. 2, p. 484, pl. 8. The church is of cruciform shape, with the tower at the south-west end, and has many architectural bits of great interest, ranging from the Transition period to the Perpendicular. Inside the inner door of the south porch is a carving of the Norman period, supposed to represent the Trinity. The second

Person is plainly recognised, with the right hand held up in blessing, and the left holding an open book; in the centre is the figure of some animal with a cross on its back and a scroll or serpent issuing from its mouth, opposite to which is another human figure with what is considered to be a bird or dove in its right hand. There are some good "squints," or "squinches;" and two recesses on the inside of the chancel wall contain earthenware jars with their mouths facing towards the altar. Were these for acoustic purposes or for containing relics? In the west wall of the transept is a pretty lancet window, considered to be a leper's window, as there was a hospital for lepers close at hand; the jambs on each side, made of somewhat friable ironstone, are deeply indented with grooves, evidently of considerable antiquity, and, as some suppose, the result of a superstitious practice of the devotees connected with the Deucalion or Pyrrha myth. The Decorated windows are remarkably elegant.

Leaving Tarrant Rushton, and crossing the downs to Badbury Rings, Professor Buckman and a large party of the members of the Dorset Field Club had already left their carriages, and were dotted about the Camp, waiting for the arrival of the representatives of the Bath Field Club. The two Clubs having joined their forces, proceeded at once to inspect the Camp, passing in through the west entrance. Having taken up a sheltered position on the east side, and opposite that entrance, Sir Talbot Baker, after a few words of apology for attempting to describe the Camp, which was much less familiar to him than either Hamildon or Hod hill, said it was evidently made by the same people as the others, and was an ancient British Camp constructed for defence, and was admirably situated for that purpose. Coker's idea that it was of Saxon construction was decidedly erroneous—"though King Edward the Elder, coming against his cousin Ethelwald, that had taken and fortified Wimborne, pitched his tents at this place." Quoting from Mr. Bloxam, he concurred in his view that the Belgæ, seeing its fine position, had fortified this hill against

the neighbouring tribes, so that it formed one of the chain of fortified camps erected by this people against their neighbours the Durotriges, who dwelt on the other bank of the river Stour, and whose great stronghold was that of Maiden Castle. Mr. Warne divided these camps into *Oppida* and *Castra*, the former being those which were continuously inhabited by the ancient people, the latter only occasionally and in times of war; and Sir Talbot thought that Hamildon and Hod hill belonged to the latter class, the cattle and herds being driven up for shelter at the signal of war, and retiring down again into the forests and clear spaces when the danger had passed away, whilst Badbury Rings belonged to the former. The opinion that this camp was continuously occupied was somewhat strengthened by the fact that water must have been easily obtained, for the members had just seen on the other side a pond which, notwithstanding the dryness of the recent season, still contained a considerable quantity of water. In conclusion, he would draw their attention to the great space between the outer mound and ditch and the inner—a feature similar to that at Sodbury Camp, in Gloucestershire—the course of the Icknield street from Sarum, which passed close by the camp, and the fine panoramic view spread out before them. Sir Talbot afterwards alluded to the large meeting of the clubmen on Badbury in July, 1645, as he had on the previous day described the suppression of that movement, within the entrenchments of Hamildon hill, by Cromwell in person. Professor Buckman having been called upon to say something as to the geology of the hill, first of all alluded to some notes which he held in his hands from Mr. Barnes, who corroborated the view entertained by Warne, Bloxam and others, that it was an ancient British camp, and further stated his view that some of the roads attributed to the Romans, were originally made by the British, and subsequently used and adapted by the Romans. As to the geology of the hill, he said the camp was in a curious and interesting position, as instead of finding, as they might have expected, the

Upper Chalk here on the top, they saw it capped by flint pebbles and clays of the Tertiary formation. This mixture of pebbles and clays made it easy for water to be procured, and grass, and even vegetables, to be grown here for the use of the ancient occupiers. He was much struck with the botanical features of the uppermost part, which was quite a marsh, and instead of the usual Chalk flora, they found the *Carduus palustris* growing here abundantly. This Plume thistle, as it was called, loved moist places; and another peculiarity was that instead of the normal purple colour of the blossoms, white flowers predominated. As they were walking along the ramparts, the botanists, no doubt, noticed many specimens of the bee orchis of the normal colour, but one variety of the same plant was found which had lost its usual brilliant hue and had become white or straw colour. Was this change due to soil or climate? The reason was not evident. The Rev. Prebendary Scarth having been called on to add a few remarks on the camp, apologised for presuming to say anything in the presence of so many local antiquaries, who ought to know much more of the camp than he possibly could from a mere cursory glance. He was well acquainted with the Somersetshire earthworks, those on his own ground, some of which were very fine, but not so large or fine as Maiden Castle, or perhaps covering the same space of ground as those he had visited within the last two days; but he might instance those of Worle hill and Dolebury camp as fine examples in Somerset. The method of construction also was somewhat different; there, owing to the abundance of stone, the hammer was more used than the spade. The one in which they were standing was evidently the work of a large tribe, for the neighbouring country must have once been thickly populated. As to their civilisation, he thought their scientific knowledge was more advanced in a rough way than was generally supposed. He concluded by apologising for the small attendance of the Bath Club, and expressed his pleasure at meeting so many ladies and gentlemen of the Dorset Club, and hoped they would

give him an opportunity at some future time of showing them some of the Somerset antiquities. Mr. Cunnington, of Dorchester, having spoken of the Roman remains that had been formerly found on the hill, the Secretary of the Bath Field Club being called on, said he was glad to hear from the previous speakers that this was almost a virgin camp, and that the plough had not yet been disturbing its surface. There was hope, then, that a scientific investigation would yet be made to ascertain the approximate date of its construction, and also the geology of the cap of the hill, the thickness of its sands and clays. He pointed out that the south-east entrance, opposite to which they were standing, appeared to be the weakest part of the camp, and he should expect to find in yonder wood traces of outworks. Perhaps some member present had investigated that point. He also alluded to the irregularities or scoops in the slope of the ramparts visible here, as also in Hod hill camp, which required investigation. As to the geology, with the geological survey map in his hand and being a stranger to this part of the country, he naturally expected to find the whole hill composed of Chalk; instead of that he found traces of flint pebbles as he walked up, and evidence that there was a capping of the sands and clays of the Tertiary formation, as Professor Buckman had said, it was in those clays that the pond had been excavated. He stated that he had been fortunate in finding near the pond several well-formed flint flakes and a large *core* of the neolithic type, not that these were in any way decisive as to the date of the camp, but were worthy of being recorded.

It was time now to leave, the Dorset Club returned to Blandford *viâ* Rushton, the Bath members *viâ* Kingston Lacy and Wimborne to Bath, not before they had thanked Sir Talbot Baker for his courtesy and the admirable arrangements made for their guidance and comfort during their visit to the Dorsetshire camps. The church at Wimborne was visited, but as a full account of this interesting Minster will be found in the last edition

(4th) of the Handbook of Wilts, Dorset, and Somerset, it is needless to recount the history or the interesting monuments which it contains. *(See Handbook of Wilts, Dorset, and Somerset, p.* 183, 4th edition.)

Westbury-upon-Trym and Sea Mills.—On Tuesday, Oct. 13th, there was a bye-excursion of the Club to Westbury-upon-Trym and Sea Mills. The train was taken to Clifton Down, thence the members walked across Durdham Down to Westbury for the purpose of seeing the Church. After some little difficulty an entrance was obtained through the well-guarded gates and doors into the Church; the time spent outside the prison-like gratings was not however wasted, as it gave an opportunity of admiring the fine Perpendicular tower, with its elegant turret staircase and canopied niche on the west face containing a figure, but, for whom intended, information was not forthcoming. The interior was evidently well cared for and contained several details of interest —in form, a nave and two side aisles with western tower and three-sided apse at the east end, a later edition in 1470. The capitals of the columns of the nave indicated 13th century date as did the sedilia in the south wall and the triplet window in the west wall of the south aisle. Rood lofts appear to have once stretched across both side aisles and chancel. A 14th century tomb had been erected by the authorities of Oriel College on the south side of the chancel to the memory of Bishop Carpenter, who, jointly with Canynge, had the credit of founding this Church; the stone tomb of the former having in 1853 been found immediately beneath—and now serving as a receptacle for coals and fagots—a use for an old tomb which was gratifying to the most practical-minded utilitarian! An account of Bishop Carpenter's tomb, with other details connected with the Church, was framed and kept in the vestry for the use of visitors, an excellent idea of a late churchwarden, Mr. Savage, who seems to have done much for the beautifying of the interior. A 17th century tomb of Sir Richard Hall, who died 1627, let into the east

wall of the south aisle, and a five-sided erection on the outside wall of the south aisle, attracted attention. The latter seems to have served as the staircase to the rood loft. Passing round the north side of the Church, and under a square, ivy-mantled tower, remains of a Benedictine monastery, the members followed the course of the Trym through Combe dingle to Shirehampton, turning aside on to King's Weston down for the fine view of the Severn and the intervening rich alluvial flats, and to Pen Pole Point for its well-known prospect. After lunching in the village below, the train was taken to Sea Mills, by some supposed to have been the post of the Roman Abone, whence the Romans crossed over to Caerwent, on the opposite coast of the Severn. Leaving the train here and turning aside to Sneyd Park, a pleasant lounge through the gardens and grounds of that picturesque place having been kindly permitted by Mr. Tagart, the owner, a rapid traverse of the downs brought some (though not all) of the party to the station. The perfect autumn, almost summer's day, added much to the enjoyment of the excursion.

Barrow Gournay.—Fine weather and the report of recent archæological discoveries induced the Club to make an excursion on Tuesday, Jan. 15th, 1884, to Barrow Gournay. Some twenty members, with their friends, were deposited by the G.W.R. at the little station of Flax Bourton by the 1.8 p.m. train, and under the guidance of Mr. O'Donoghue, wended their way across pleasant meadows, already putting on vernal freshness, to the Elizabethan mansion at Barrow Gurnay known as Barrow Court, recently purchased by Mr. Gibbs, of Charlton Park, and now under process of renovation.* Their Vice-president, the Rev. Prebendary Scarth, had preceded them, and having collected his audience under a cedar of Lebanon, opposite the fine façade of

* After the suppression of the Priory King Henry VIII. granted the house and demesne lands to John Drew, of Bristol. He converted the old building into a dwelling-house. (See Collinson, Vol. ii., p. 311 ; also for an account of the succession of the property.)

the Court house, gave a short history of the same, gleaned mainly from the Rev. Thomas Hugo's paper in Vol xii. of the "Somersetshire Archæological Society's Proceedings," and from "Gossiping Notes," recently contributed to the *Bristol Times and Mirror* by the Rev. W. H. Hardman. The Elizabethan mansion before them (he said) occupied the site of a small Priory called Mynchin Barrow Priory,† one of the mediæval nunneries of Somersetshire, inhabited by nuns of the Benedictine Order, and dedicated to the Blessed Virgin Mary and S. Edward, king and martyr. Its situation on a pleasant rising ground or knoll probably gave it the name of Barrow, formerly spelt "Barwe," or "Barewe." The word Mynchin, of course, was a mediæval term for a nunnery. The name of Barrow Gournay arose from the connection of the noble family of Gournay with this Manor. Indeed the foundation of the establishment is by some attributed to Eva de Gournay, granddaughter and heir of Robert Fitzharding, to whom William Rufus had granted the property. This Eva de Gournay married Thos. de Harptree (temp. Richard I.), and died before 1230. Her son, Robert de Harptree, assumed the name of Gournay, and was founder of the Hospital of Gaunts in Bristol. Subsequently the Manor passed into the possession of the Berkeleys, Comptons, Clarks, Gores, Blagraves, from whom it passed to the present proprietors, the Gibbs. The list of the prioresses was given, and the date of their death, drawn up from Rev. Thomas Hugo's paper, differing somewhat from that given by Collinson. The nuns seemed to have obtained a yearly pension from the Church of "Twiverton," near Bath, of £1 6s. 8d., or "two marks." Mr. Scarth concluded by saying that the present Court had been built out of the materials of the old Priory, and that nothing at all belonging to the latter date had been found until quite recently, when some encaustic tiles had been exposed *in situ*, which he would proceed to show

† Mynchin, from Saxon *Minicene*, a nun.

the members in due course. Entering by the porch the members rambled through the interior of the house (by the permission of Mr. Gibbs) and inspected the work of renovation going on in hall and chamber, Jacobean chimney pieces, oak panelling and elaborate ceilings. Over this porch is a shield containing a fesse, between three cross-croslets fitché (query arms of Gore). Having finished the inspection of the interior Mr. Scarth took the members to the west end of the Church, close adjoining the Court house, where the recent discoveries had been made. These consisted of a square patch of encaustic tiles with various patterns and coats of arms. Some of the bordering letters were read as following, beginning from the left hand :—DAM . . . . JOANNA D ACTONE MISERERE. . . . . Mr. Browne said that some of the tiles with double birds on them reminded him of those found at Keynsham Abbey, and he considered them of the date of the 14th century, and that they once formed the pavement of the nave of the Church, which extended west in that direction. Amongst other arms those of the de Clares—three chevrons—were clearly made out. On the south side some human bones had been found. The Church consists of a nave and south aisle, with tower at west end of nave. Part of the south aisle walls appears to have belonged to the old Church, and there is a Transitional pointed arch between tower and nave. The tower is of Perpendicular work. The rest of the Church is of poor design, the windows of a debased gothic—probably dating about 50 years back. In the south aisle are several monuments of Elizabethan and Jacobean date. The Church did not contain much to interest the members, a monumental slab with floriated cross, found in the churchyard and placed inside the west door, was the chief piece of archæological interest. In the churchyard the pedestal of the cross lately erected was considered to be merely the base of a font of the 13th century style, the cross and steps being modern. The very durable-looking freestone composing the coins of the house

attracted attention, and though Oolitic was not recognised by the Geologists present as forming any bed in the neighbourhood, until an examination of some trenches cut in the meadow land to the north of the church revealed a bed some foot or more thick of a kind of bastard Oolite admirably adapted for exposed work, from hence the old people who built the Priory derived probably most of the material used for their building close at hand.

The Vicar, Mr. Wadmore, kindly placed his carriage at the disposal of the members, and met them at the court ready to supply any information as to the recent finds. Some walked back to Bristol, others returned to the Bourton station for the 4.5 p.m. train to Bath.

Of the weekly walks the Secretary has little to record, save that they have been maintained by a few members with varying regularity, probably more with the view of bodily exercise than with that of investigating anything in particular connected with the objects of the Club. It only remains to add, in conclusion that the number of members remains at the usual standard. Several vacancies, owing to various causes, removals from Bath and deaths, have occurred, but new members have been enrolled, and the funds are prosperous; so much so that they have admitted of the first number, which has long been out of print and has constantly been inquired for, being reprinted. The Library continues to be enriched with valuable publications of kindred societies, and it only remains for some object of interest to arouse the abundant energies of the Club into startling activity.

H. H. WINWOOD,

Hon. Sec.

Bath
29.7.82

LEWIS, SONS & TYTE, THE HERALD OFFICE, NORTH GATE, BATH.

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Stanton Drew. *By* J. Allon Tucker.

(Read March 12th, 1884).

My object in bringing before the notice of the Bath Field Club the groups of stones at Stanton Drew—concerning which those well skilled in antiquarian lore have written much without coming to any satisfactory conclusion as to the mystery which still hangs round them, and will till the end of time—is to present in as intelligible a form as possible some account of these remains, situated as they are within the County of Somerset, and within easy reach of Bath; and as the Club visited Stanton Drew last year, doubtless members, more competent than I am, will assist in bringing us to the most reasonable conclusion respecting them. So much has been written on this subject, and the accounts vary so, that almost every hypothesis has been fully discussed, and little room remains for originality.

There are various parishes in England called Stanton. In the County of Somerset alone, we have the names of Stanton Drew, Stanton Prior, Stantonbury hill, Stanton Wick, all close together and in the great manor of Keynsham, and one simply Stanton in Dunster.

These are doubtless from the same derivation, viz., A.S., "stan," a stone; and "tun," a town; and the word added to it, in good many cases, served the purpose of distinguishing one place from another, and was generally taken from names of the ancient lords of the place—*e.g.*, Stanton Prior used to belong to the Priors of Bath; and Stanton Drew, to the Drew, or Drogo, who came from Dreux in Normandy, and concerning whom there is amongst the documents of the Dean and Chapter of Exeter one (evidently of the 12th century), by which one Drogo, or Drew, acknowledges his tenure under a tenant in chief, named Dennis. The Stantons appear to have taken their names from this parish, and possessed the land from about the date of the Norman Conquest; and in Domesday, and in other books, they are variously called

the de Stantons or Stantunes. They appear to have been very considerable owners of land. Robert de Stanton accounted for two Knights' fees in the time of Henry II.

In one history, which I have come across, it is stated that Stanton Drew means "the stone town of the Druids," referring to the stone circles there; but I think this must be looked upon as too literal an interpretation of the words.

That "Stan," in Stanton, is a word meaning stone is certain, but the word meaning stone is not always applied to a place where some particular stone monuments exist. But in a great many cases I think it is used to refer to some stone, or paved road, if it be considered that the word is one which the Romans, the makers of such roads, would have adopted.

I am not starting this proposition as an explanation of this particular name alone, but I think that an examination of the various places in England, called by some such similar name, supports the idea that the situation of such place was near one of the Roman roads.

The word "Drew," as I have said, is one added to Stanton by way of distinguishing it, and is Frankish, as, in the form of Drogo, it belonged to an illegitimate son of Charlemagne. It was brought to England by Dru de Baladon, a follower of the Conqueror, and it is very likely the same word as Dreux, a town in Normandy. It is curious that the Druids of Gaul used to meet for the purposes of deciding litigation, and for other national matters under their primate, or chief, at a place which is supposed to be the present site of this town of Dreux.

Although it has generally been agreed that the remains at Stanton Drew are the oldest of the three great groups of Megalithic antiquities in the West of England, because the stones bear no trace of having been worked, yet the accounts we have of them are more recent than those of the others. The first writer appears to be John Aubrey, in 1664; then Dr. Musgrave, 1719; Keysler, 1720; Dr. Stukeley, 1723; Collinson, 1791; Seyer,

1821 ; and later, Sir Richard Colt Hoare ; Mr. William Long, whose account in vol. xv. of the "Antiquarian Journal," 1858, is very good ; and more local writers, Rev. Preb. Scarth, 1869 ; and Mr. C. E. Dymond, 1871, both of whose papers appear in the proceedings of the Somerset Archæological Society. The latter's is most minute and detailed as to the number of stones, the sizes thereof, and admeasurements of the distances between them respectively. Each writer almost, gives his own particular theory, and the numbers and positions of the stones ; but a good many differences occur between them. The old legend, that it is wicked to attempt to count them, appears to have been changed now into an idea that amongst the different accounts, one finds oneself in almost a maze whilst endeavouring to reconcile one with another. Mr. Scarth suggests that the Somersetshire Society might, with advantage, have a careful survey made, but Mr. Dymond is so correct that he may be said to have supplied the needed want. It would be well that some care should be taken by archælogists, that the stones be kept from injury. If this had been the desire of former owners and occupiers of the Stanton Drew property, the mystery attaching to one of the grandest monuments in the West of England might be more easily solved than at present. It is known that cart-loads of stone have been broken off for various purposes, including that of mending the roads, and one tenant is said to have buried some of the stones for the purpose of utilising the little space they stood upon. This, of course, renders the counting of the stones much more difficult, as it is impossible to tell where all are, although some can be distinctly traced, in hot summers, by the burnt appearance of the grass above them.

With respect to the material of these stones, nearly all the authorities, including the eminent geologist, Mr. Chas. Moore, agree that the Conglomerate, of which the major part are composed, is similar to that found in the neighbourhood—some say at Chew Magna, others at Broadfield Down, about three miles from

Stanton Drew, and that they bear no trace of having been cut or hewn from large pieces.

As to the situation of these remarkable monuments of a bye-gone age, they are scattered over a somewhat wide tract, close to the village and Church of Stanton Drew. They may best be described by treating each group separately, as each group was very likely used for a purpose of its own.

1. Three stones, called the Cove, by Stukeley, some distance from the circles, two of which are upright and one is prostrate, the former are about 14 and 11 feet high respectively. The fallen one is broken, and it is not easy to tell what was its original size. They are all of the same sort of composition. The stones are very hard, and, although showing signs of breakage in former times, yet, according to what I am told, now withstand the severest frost. It is said that the fallen stone was placed on those now upright, but this is only a conjecture, arising from the idea that these stones together formed a dolmen. There is nothing to bear out this idea, and then one of the upright stones is much shorter than the other. The other supposition, which would appear to be more likely, is, that the stones together formed a triangular erection, as there are no signs of any other stones under the ground close by.

2. About 150 yards S.E. of the cove is a circle, originally of 12 stones, all of which are prostrate, and consist of six in the orchard, three in an adjoining field, one in the wall, and there are traces of two others buried, which would complete the circle. This was called, by Stukeley, the Lunar Circle. There are also some broken fragments of stones about the centre of the circle, which might have been placed there to form together an altar or elevated place. The diameter is 140 feet.

3. The largest circle, the diameter of which is about 350 feet, is situated in an adjoining field, and has the river Chew near the eastern side. This is really an imposing group of stones, the large level tract of ground and the views of the adjoining country serving to improve it.

Mr. Long, in his paper in vol. xv. of "Archæological Journal," says that 14 stones remain; but Mr. Dymond, in his most careful survey, says 24, of which six are quite buried; but states that 10 of his total number were only found after very careful search. The Rev. Samuel Seyer (1822) calls them 27, of which 14 are above the surface, and these are now plainly existing; eight are partly visible, and five probably under ground. The Rev. H. T. Perfect, Vicar of Stanton Drew, tells me that he has verified 23 of these, but he cannot find Nos. 3, 10, 19, or 27; and very certainly a great many others can only be ascertained by careful probing.

4. The avenue consists firstly of five stones, three erect and two prostrate, and then at some little distance the avenue is continued in a somewhat irregular line by seven stones, or according to some writers 10; but several of these are so broken and scattered that it is difficult to distinguish them, and there has been a considerable divergence of opinion as to these stones. One writer in the "Gentleman's Magazine," some years ago, confessed his inability to make any suggestion whatever as to these; but the supposed avenue, leading as it does up to the group of stones, which I shall presently refer to, would be doubtless adapted for a procession from one circle to another, although not by the nearest way.

5. The next group, called by Mr. Seyer the Circle of Eight, is interesting, because the group of stones on the south-east side thereof, has been called the altar. Mr. Dymond points out five erect and four prostrate stones, but No. 1, included in the former, is in two, if not more pieces; and they have all been a good deal injured. The upright stones are of a more imposing height, and are not so rough as those in some of the other circles; the upright ones averaging 11 to 13½ feet in height. The diameter of this circle is 95 feet.

6. The large stone in the side of the road leading from Pensford to Stanton Drew and known as Hautville's quoit, is

generally considered to be of the same age as the stones in the circles at Stanton Drew. Its present size, remarkable as it is, is about 7ft. by 7ft. by 2ft., but we are told that cartloads of stone have been taken from it, and that its original weight, when it was considerably larger than at present, must have been about 30 tons.

The story attached to it is, that Sir John de Hautville, whose effigy and tomb we see in the church at Chew Magna, threw it from Maes Knoll; and if we believe that he ever carried out this feat or even lifted it at all, we must put it down to the times when giants roamed over these parts of Britain. This stone has without doubt been in its present position for many hundreds of years, and it must truly have been an object of much interest to passers-by.

There is a small stone used for the step of a stile near the great circle which is, as far as I am able to judge, of the same sort of Conglomerate as the other stones. It is about 3ft. by 3ft., and 2ft. thick, and although I find no mention of it in any of the accounts of Stanton Drew which I have seen or in any of the maps, I am of opinion that it belongs to these remains, but was removed by the owner or occupier of the land, in order that it might be so utilized. This is not inconsistent with any plan or theory as to the use to which these stones were originally applied, for it is evident that there must have been some more stones than at present exist.

There are also two stones in the Lower Tyning on the opposite side of the village of Stanton Drew, and Seyer and Dymond include them in their maps as belonging to these remains. I do not see any account of them in any of the papers that have been written on the subject. They appear to be composed of a similar Conglomerate to that mentioned before and one of them measures 5ft. by 3ft. 5in. by 2ft. 3in., and the other 5ft. 9in. (length), 5ft. 5in. (greatest breadth), by 1ft. 8in. (greatest thickness). Both are prostrate on the ground.

The total number of stones, therefore, which appears to have existed or do now are—cove, 3; south east circle, 12; large circle,

23; avenue, 12; circle, 8; and the Quoit and 3 other stones make the total 62.

The questions which now occur to one, and they are not easily answered, are—For what reasons were these prodigious stones placed in this particular neighbourhood and by whom? The labour of bringing them to their present position and putting them by others in a form complete enough for the purpose to which they were intended to be applied must have been enormous. Some it is calculated weigh from 15 to 30 tons; and for people whose work was done by their own muscular exertions alone, it must certainly have been a long and heavy task. Various suggestions have been made amongst others that they were a monument to some great victory; and as Collinson says that blood was freely poured on the Wansdyke, future historians may record them as memorials to important fights; or, according to Fergusson, to the eleventh battle of the problematical King Arthur; and others that they were for scientific and astronomical purposes. I am not satisfied with either of these conclusions. Fighting was indulged in by our forefathers to a considerable extent, feuds were rife, each man depending on his sword and his strong arm; and a battle was of so frequent an occurrence that it would not be likely that such a monument as this would be raised to celebrate even an important victory, and why should such a memorial take this form. This latter is sufficient reason to negative such an idea, and that it was put up to obtain observations from the stars, or in any way for scientific purposes does not appear a sufficient explanation of it. More of a national purpose must have been intended by it, and what more popular to these rough and uncultivated denizens of Somerset than a religious or national purpose. From the earliest times people have spent a great deal of their substance in rearing temples for their worship, money and trouble were both lightly considered in such a case, and only for some purpose likely to be popular in the eyes of the people would such buildings be erected. It has been considered by some that

these are only the remains of some vast temple of which Hautville's quoit formed the portal, but such a gigantic building is carrying the imagination too high, and, besides, there are no other traces left. From the very little knowledge we have of the manners and customs of the so-called Druids—whose priests exercised for many years a mighty and extensive rule not only over the people in religious matters but also controlled secular affairs and decided litigation—we can gather from the evidence which has come down to us, though in an unsatisfactory manner, that their temples, simply built as they were, were formed in the shape of circles, and that the space in which they stood was large enough for immense assemblies of people, before whom sacrifices were made, and where on certain occasions disputes were settled. For such of these one can imagine the stone circles were erected; and for these, people would be likely to give their time and labour, as they were subject so much to the Druidical priests. That there is no certainty as to this I freely admit. The bulk of the writers on Stanton Drew have put these at a date pre-Roman; and if we agree that Stonehenge was so, it necessarily follows that Stanton Drew is in the same category. Whether this Temple was erected by the Druids or only used by them—and possibly the work of a primeval or pre-historic race, or of the Belgæ, who subdued and expelled them—will be a subject of controversy to the end of time.

Notice of a second capture of the rare Longicorn, taken near Bath, in September, 1883. *By the* Rev. Leonard Blomefield, M.A., F.L.S., F.G.S., &c., President.

(Read December, 10th, 1884.)

It will be remembered that in September last year, a specimen of a rare Longicorn Beetle was captured on a wall near Bath, and exhibited to the Natural History Field Club at their first

afternoon meeting, a detailed account of the same being afterwards published in the last part of the Club's Proceedings.* I have now to record the capture of another specimen of the same insect, on the 29th October last. This specimen larger and finer than the former one, the length of the body exceeding an inch, was caught on the back of a man employed in cutting up blocks of wood in a timber yard, on the Bristol road.

On the occasion of the first capture, the insect was supposed to be the *Acanthocinus ædilis*, of Megerle and Stephens; but I had a suspicion at the time, from its larger size and more varied colours than those of the *A. ædilis*, as represented by Donovan, that it might prove to be a different species, and probably a foreigner accidentally introduced into this country. This suspicion has now become a certainty. There is no question as to the insect captured this last autumn being of the same species as that taken in the autumn of 1883; and on correspondence with Mr. Fitch, the Secretary of the Entomological Society of London, and Mr. Waterhouse, of the Natural History Museum, South Kensington—the subject having been also brought under the notice of the members of the above society at one of their meetings in December last—it has been clearly ascertained that both specimens belong to the genus *Monochamus* Serville (Ann. Soc. Ent., France, 1835, p. 91), and are identical with the *Lamia dentator* of Fabricius;† the *L. titillator* of that author being the same insect.

Monochamus is one of the very numerous genera which have been made by modern Entomologists out of the old Linnæan genus *Cerambyx*. The type of the genus is *M. sutor*, L., a species that has occasionally been met with in this country, and is figured by Donovan in his "British Insects."‡ Nearly allied to this last is *M. sartor*, also a rare British species, figured by Curtis

* Vol. v., part 3, page 172. † Entomolog. Syst. Tom. I., p. 278.
‡ Vol. xiii., pl. 435, fig. 1.

in his British Entomology.* *Monochamus* is said to be "a genus rich in species distributed nearly throughout the old world and in North America."

The *Monochamus dentator*, the species to which the Bath captures belong, is well distinguished by the compressed intermediate tibiæ, with a small toothlike process on the dorsal edge towards the apex. In reference to its occurrence in Bath, it appears that this is not the only instance in which it has been taken in this country. In the first, and only volume that was ever published, of the Transactions of an old Entomological Society that existed in London many years before the present society took its rise, there is a notice by Haworth, the well-known Lepidopterist, of a specimen taken "in the area of a house in Gloucester Street, Hoxton, August 10th, 1806;" and, what is more, there is a coloured figure of it, showing it clearly to be identical with the two insects taken near Bath. A copy of this rather uncommon book is in the Jenyns Library, where such members of the Club as are interested in the subject may see the representation alluded to.

I am informed also by Mr. Fitch, Secretary of the Entomological Society, that there is a specimen of the *Monochamus dentator* in the National Collection, which was found alive at Caterham Valley, Surrey.

Probably in many, if not in all of the instances in which this species and some other closely allied Longicorns have occurred in this country, the insects have been imported from abroad in timber.

There is no question as to this having been the case with respect to the two specimens of the *Monochamus dentator* taken in Bath, looking to the circumstances under which the second capture was made. The timber in the yard was found, on inquiry, to have come from North America, where this insect is abundant.

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* Coleoptera, part II, pl. 219.

Further, on examining one of the blocks of wood, it was found to be perforated in two places, the size of the hole, exactly corresponding to that of the body of *Monochamus dentator*, and no doubt these passages from the interior were those by which the perfect insects had effected their egress.

Both the Bath specimens of *Monochamus dentator* were taken in the Autumn, from which we are led to infer that season to be the one in which they ordinarily appear.

Both specimens likewise were males, with the antennæ in each case exactly four inches in length. If both sexes of this insect were imported into this country, and the conditions of the locality in which they happened to settle were favourable, as to climate, wood, and the particular trees required to support them in the larva state, there is no reason why the species should not breed in this country and eventually become naturalized.

The *Acanthocinus ædilis*, to which species the Bath captures were in the first instance erroneously referred, and which has been met with in widely different parts of Great Britain, is thought to be nowhere indigenous except at Rannoch. In the cases in which it has occurred elsewhere, in one instance even in the midst of London, this species may have been originally introduced, and afterwards spread of itself to more distant parts of the country.

Anyhow it is desirable that every occurrence of the rarer species of Longicorns in this country should be recorded, that we may determine in each case, as far as we can, the limits of their geographical distribution.

The Natural History of the British Owls. *By* D. Williams, F.L.S.

(Read December 10th, 1884.)

Our respected President and Founder in his paper last year rather reflected upon the members of the Club for devoting the papers read at these meetings chiefly to Geology or Archæology,

to the neglect of Natural History. This induced me to select some subject in Natural History for my paper this afternoon, and I purpose to say something about that very interesting family of birds—the Owls.

To begin with the word Owl is peculiar, and it is difficult to trace its origin. It does not correspond in any way with the name given to this family either in Greek, Latin, German, French, Welsh or any other language, and seems to be a corruption of the word "howl," in allusion to the peculiar cries made by these birds.

Owls have particularly attracted the attention of writers; they are frequently mentioned in the Bible, and poets and authors of all ages have written about them. If I were to commence to quote I should take up too much of your time, so I shall leave that alone and stick closely to my subject.

It is a common remark that the Owl may be considered as a kind of nocturnal Hawk, differing, as Linnæus has observed, from these birds in the same manner as Moths differ from Butterflies, the one being chiefly noctural, the other diurnal. They are distinguished by having a large head, great projecting eyes directed forwards, and surrounded with a disc or circle of loose and delicate feathers covering the base of the beak and the opening of the ears; a strong hooked bill, curved claws, and a downy plumage, generally spotted or barred with different shades of brown and yellow.

Unable to bear the bright light of the sun, the Owl retires to some lonely retreat where it passes the day in silence and obscurity, but at the approach of evening, when all nature is desirous of repose, and the smaller animals, which are its principal food, are seeking their nestling-places, the Owl comes forth in search of prey.

The Owls are usually arranged into two principal groups; in one of which all the species exhibit two tufts of feathers, which have been called horns, ears or egrets, but which have nothing to

do with the sense of hearing; in the other group the heads are smooth, round, and without tufts. Before describing the different species, it will be well to take note of some of the distinguishing features in the economy of the Owl. The first thing that strikes one on looking at the Owl is the size and prominence of the eyes; they remind one of the exclamation of Little Red Riding Hood, when she found the wolf in her grandmother's bed, "What great eyes you have got." The eyes are formed so as to take in every ray of light, and instead of being placed on each side of the head, as in other birds, are situated one on each side of the hooked beak, in the centre of what we may call the face. So sensitive are they to the influence of light, that they are unable to endure the glare of daylight, being formed expressly for the dim light of evening or the earliest dawn. An ordinary Owl, of almost any species, when brought into the full light of day, becomes quite bewildered with the unwonted glare, and sits blinking uncomfortably in a pitiable manner, seemingly as distressed as a human being, on whose undefended eyes the meridian sun is shining. But the Owl is furnished with an inner eyelid, or nictitating membrane, which stands it in good stead under such circumstances, and by repeatedly drawing this thin membranous substance over the aching eyeball the Owl obtains some relief from the pain which it is suffering. The eyes are set in a horny ring, which is capable of expansion and compression, and they are placed in a large concave disc, like a lamp in the centre of a reflector. The use of the facial disc, which surrounds the eyes, has been a puzzle to naturalists. Some think that the use of the disc is to collect the rays of light and throw them upon the eye. This principle may be carried out in the case of the Barn Owl, where the feathery circle, being of a whitish hue, may be supposed to act as a reflector of the light. But it must be remembered that in the Brown Owls this circle is also brown, and, therefore, would rather absorb than reflect light. The Rev. J. G. Wood seems to give the most feasible explanation of its use, he says;

"In my opinion the radiating feathery circle is very simple in its operation, being only a kind of circular splay window cut through the thick mass of plumage, in which the head of the bird is enveloped, in order to give it a wider sphere of vision, just as architects cut a splay in the thick wall of a fort, so as to permit a musket barrel to be pointed in any direction. And the radiating formation of the feathers is preserved, because the natural elasticity of their stems presses aside the softer downy plumage of the head and preserves the circular form complete. If examined they will be found to be formed in a peculiar manner, and quite distinct from those on which their extremities press." The ears are placed behind the disc, and are very important and highly developed organs, for the Owl hunts for its prey as much by hearing as by sight. In some of the species the ears are very large. They have a large conchal opening and an operculum of greater or less size; the whole can be thrown open at pleasure, and exposes a large concave opening, which, in a time of complete silence, is admirably fitted to catch the slightest vibration of sound. The operculum acts in the same manner as the tympanum of the human ear, and conveys the sound to the auditory nerve. The plumage of the Owl is of the softest texture "falling gently on the air." The wings are constructed for a light, buoyant and noiseless flight; for independent of soft and downy feathers, they have webs with the plumules disunited at the tips or separated like the teeth of a saw, allowing a free passage to the air or possessing a pliability to yield to its pressure; yet the proportion of quills is similar to that belonging to birds endowed with a powerful flight, and we see its use in the easy light-skimming or sailing near the surface of the ground or cover. But in addition to these provisions for allowing a noiseless approach to their prey, we find another nearly as essential, and where a contrary arrangement would have rendered the first useless. The colours of the plumage exhibit a union of tints best suited for concealment; nothing marked or obtrusive, no bright or gaudy plumes which

might quickly catch the eye of an otherwise unwarned prey, but a chaste and harmonious blending of the more sombre hues, mixing as a whole into a neutral tint, but showing on close inspection the most minute and delicate of nature's pencillings. The feet are admirably adapted for grasping. In their normal position, they are the same as in other birds, namely three claws in front and one behind; but the Owl has the power of turning the outer claw back parallel with the hinder claw, thus making the foot with two claws in front and two behind, the same as in the Scansores or Woodpeckers. The foot can thus be used for scrambling in the interior of chimneys, where these birds are often found, or up the bark and hollows of trees.

The Barn Owl is generally considered to be the typical example of the tribe, as it exhibits in great perfection the different characteristics of the Owls, namely, the thick coat of downy plumage, the peculiar disc round the eyes, the large eye-balls, and the heavily feathered legs and toes.

There are ten species of Owls known in the British Isles, some of which are rare visitors. They are—

The White Barn or Screech Owl,
The Brown or Tawny Owl,
The Little Owl,
Tengmalm's Owl,
The Hawk or Canada Owl,
The Snowy Owl,
The Great Horned or Eagle Owl,
The Short-eared or Woodcock Owl,
The Long-eared Owl, and
The Scops-eared Owl.

The White or Barn Owl is dispersed more or less generally all over the earth; it is, however, least numerous in the colder regions. Northward, it occurs so far as Denmark. Its range southward extends to the Cape of Good Hope, eastward to India and New Holland, and westward to the United States. The

bird is a perennial resident with us, and frequents the same haunts for a succession of years. The whole plumage is beautifully clean and pure. Old birds become more white. It inhabits church steeples, old and deserted as well as existing buildings and ruins, chimneys, caves, barns, pigeon lofts, and, but very rarely, hollow trees. The nest is formed of a few sticks or twigs, lined with a little grass or straw, or (though but seldom) with hair or wool. The eggs are white and of a round shape, generally two or three, but sometimes as many as five or six in number. It displays considerable affection for its young; but when they are old enough, they are driven away from the nest to find a home elsewhere. Its food consists principally of moles, rats and mice, as many as fifteen of the latter have been found close to the nest of a single pair, part of the produce of one night's forage, for doubtless others must have been eaten before morning. This bird has two modes of eating. If it has caught a mouse and is going to eat it, the mouse is first bitten across the back, so as to destroy all life; it is then thrown up into the air in a most adroit manner, so as to fall with its head downwards. The Owl then catches it in its mouth, a smart toss of the head sends it down the throat with the exception of the tail, which hangs out of one side of the beak, and after rolling it about for two or three minutes, another gulp sends it wholly out of sight. But when it has to do with a bird, it eats it after the manner of the Hawks, partially plucking it and tearing it to pieces with its beak before eating it. The Owls, like the Falcons, return by the mouth the indigestible parts of the food, in the form of elongated pellets; these are found in considerable numbers about the usual haunts of the birds, and examination of them, when softened with warm water, detects the nature of the food, the skulls are always voided whole. It is said to collect and hoard up food in its place of resort, as a provision against a day of scarcity. This Owl is an experienced fisher, and has been seen to drop quietly upon the water and return to its nest bearing in its claws a perch which it had captured. I once

had one of these birds in a conservatory, where I also kept a number of canaries in cages hanging against the wall. At one time the place was over-run with mice, who used to climb up into the canaries cages after the seed, they grew so bold, that when I went into the place at night, instead of running away, they would get between the cages and the wall; all that I had to do to kill them was to press the cages against the wall. One night I had killed a great number, so I thought I would try the capacity of my friend, Mr. Owl, he managed to get down sixteen but failed at the seventeenth. He took them all in the manner I have described, head downwards.

Bishop Stanley says, "Generally speaking a more useful race of birds does not exist; since, with the exception of one or two of the larger species, their food consists entirely of vermin and insects, very prejudicial to our crops; and which, but for these nocturnal hunters, might do serious mischief. A striking instance of their utility occurred some years ago in the neighbourhood of Bridgwater, where during the summer such incredible numbers of mice overran the country as to destroy a large portion of the vegetation; and their ravages might have extended to an alarming degree, had it not been for a sudden assemblage of Owls, which resorted from all parts to prey on them." As many as twenty-eight Owls have been counted in one single field, collected together, no doubt by swarms of mice, which, in a favourable season, had been bred there. Mr. Waterton says that "if this useful bird caught its food by day instead of hunting for it at night, mankind would have ocular demonstration of its utility in thinning the country of mice." When it has young, it will bring a mouse to the nest every twelve or fifteen minutes.

Although so small, it is a terrible bird to fight, and when it flings itself defiantly on its back, ire glancing from its eyes, and its sharp claws drawn up to its breast ready to strike as soon as its antagonist shall come within range, it is really a formidable foe, and will test the nerves of a man to some extent before he

can secure the fierce little bird. So fiercely does this bird strike, that an instance is recorded where a dog was blinded by one stroke of a Barn Owl's claws. The Owl was a tame one, and the dog—a stranger—went up to inspect the bird. As the dog approached the Owl, the bird rolled quietly over on his back, and when the dog put his head to the prostrate bird, it struck so sharply with its claws that it destroyed both the eyes of the poor animal. Whilst its young are helpless, the White Owl watches over their safety with great vigilance; and if any living thing, such as a man or a dog, should approach too closely to their domicile, the Owl will dart fiercely at them, regardless of the consequence to itself. The note of this species is a screech, and it seldom, if ever, hoots.

The Tawny or Brown Owl is spread very generally over Europe. It is found in Lapland, Scandinavia, Russia, Spain, Italy, also in Asia Minor and Japan. It is a common species in England, but is more rare in Scotland and the North of England, where the Long-eared Owl takes its place. Although rather a small bird, being about fifteen inches in length, it is possessed of a powerful pounce and audacious spirit. It inhabits woody districts. In the winter, when the trees are bare, it secrets itself in old buildings, the hollows of trees, or in evergreens, such as firs, hollies or ivy. The colour of these birds varies very much; scarcely two individuals are met with precisely similar in their markings. The nest, if it deserves the name, is formed of a few soft feathers, a few straws or a little moss. The eggs are white, from two to three or five in number. The young are hatched in April; they continue to perch among the branches of the trees in the neighbourhood of the nest before taking their final leave of it, and are fed during the interval by the parent birds.

The food of this species is of a varied character, consisting of leverets, young rabbits, moles, rats, mice, and other small quadrupeds; birds of various kinds, frogs, beetles and other insects, worms and fish. Sir W. Jardine notes that fish are

proved to be a part of the prey of this bird. Mr. Bloxam and Mr. Brec both notice it, The latter says, "Some years since several young Owls were taken from the nest, and placed in a yew tree in the rectory garden here; in this situation the parent birds repeatedly brought them live fish, bull heads *(cottus gobio)*, loach *(cubitus barbulata)*, &c. Since the above period, I have on more than one occasion found the same fish, either whole or in fragments, lying under the trees on which I have observed the young birds to perch after they have left the nest." Mr. Waterton also confirms the fact; and from different localities it would appear that this food was pretty generally sought after by the Brown Owl. We have an anecdote mentioned by Mr. Jennings, where gold and silver fish in the flower garden at Bulstrude were missing; and watchmen being appointed, saw Owls, which they called the common Brown Owl, alight on the side of the pond, and "there waiting the approach of the fish, captured and devoured them." Mr. Waterton also remarks "I have found by dissecting the bolus or pellet ejected by this species, that it feeds copiously on different sorts of beetles," a circumstance not entirely confined to this species. These birds appear to be even more sensitive of light than the Barn Owl; and Montague remarks "and so defective is its sight in a bright day, that it is no uncommon thing for boys to hunt them down with sticks and stones." During its flight in the day and when disturbed, it moves in silence, but at night it is this bird which principally utters the peculiar toned hootings—this hooting is the most peculiar call of the genus, and from its melancholy and sometimes startling noise has led the superstition in all countries where they are natives.

This hooting has led to the calling of this species by a separate Latin name. Most of the Owls have the Latin names of *Strix* or *Bubo*. Cuvier called this species ulula stridula, from ululare, to howl like a wolf; and stridula, harsh—grating—creaking.

There are two points about this bird which I have verified. I

have had a pair about three years, and have never known them drink. They are very fond of a bath, but will never use the water a second time. The boys in the road, knowing that I have Owls, call out to them, and the birds answer them. They are very tame, and snap their beaks in token of recognition. They are very fond of one of my boys, and will perch on his head or shoulder.

This and the Barn Owl are the only ones which I have known in the live state, for descriptions of the others I trust to stuffed specimens.

Of the Little Owl many specimens have been captured in England, and even the nest and young occasionally discovered, but it is a rare visitor. Two were taken in chimneys, many years ago, in the parish of Lambeth. One was seen in Wiltshire, nailed against a barn door. Three are recorded as having been met with in Devonshire, one in Worcestershire, one in Flintshire, one near Bristol; a pair bred near Norwich, and two other specimens have been authenticated in Norfolk, and a few in other places. It is properly a native of Germany, Holland, France, and Austria. The name of Little Owl is very appropriate, for it is only eight inches in length, including the plumage, and when stripped of its feathers appears hardly as large as a common starling. The general colour of this bird is clove-brown, banded and marked with yellowish-brown, gray and white. The nest, so far as one is made, is built in chimneys, and other parts of buildings, pine and other trees, about half-way up; as also in osier beds. Its food consists of small birds, bats, mice and various insects. It is so voracious that, according to Bechstein, it can swallow five mice at a single meal.

Tengmalm's Owl, or Death Bird, received its specific name from Gmelin, in compliment to the discoverer, Dr. Tengmalm, of Stockholm. It is called the Death Bird on account of a common superstition that reigns among several of the North American Indian tribes. When an Indian hears one of these birds

uttering its melancholy cry, he whistles towards the spot from whence the sound proceeds, and if the bird does not answer him he looks for a speedy death. The occurrence of this bird in England is very rare. In Yorkshire one was killed at Thurmanby, in the East Riding; in 1836 a specimen was purchased at a poulterer's shop in London; another was killed the same year in Kent; one on the sea-coast at Manden, in Durham, in October, 1848; and one at Morpeth in 1812. The colour of this bird is more rich and rather more defined than that of the Little Owl. The whole of the upper parts of the body are of a rich chocolate-brown, dotted and splashed with many white markings, which are very minute upon the top of the head, and large upon the back and wings, some being arranged on the lower portions of the wings, so as to form irregular stripes. In length, from the top of the crown to the extremity of the tail, it is from eight and a half to nine inches. It frequents wooded districts, the thick and extensive forests of the north, orchards and other lesser plantations. These birds breed in holes of trees. The eggs are white, and two in number. Its cry, in the night, is a single melancholy note, repeated at intervals of a minute or two.

The Hawk, or Canada Owl, is one of the most interesting birds in this family; as it forms a distinct connecting link through the hen Harrier with the Falcons. In the hen Harrier we find the commencement of the peculiar facial disc and in the Hawk Owl this disc is not nearly so well defined as in the other members of the same group. The eyes are differently formed, as the bird is able to follow its prey by day as well as in the dark, and therefore requires a character of eye which will not be injured or half-blinded by ordinary daylight. This bird possesses many points to show that it is a connecting link; the long tail and small head of the Hawk, as well as the habit of flying by day; and resembling the Owl in the ruff and feet; one might almost think it a hybrid between the two.

This bird is an inhabitant of Germany, France, Denmark, Norway, Sweden, Lapland, Russia, and other parts of Northern Europe. It is very rare in England. It is plentiful in all the high latitudes of North America. This bird frequents small woods. The nest is built in a tree, and consists of sticks, grass and feathers. The eggs are white, and two in number. The general colour of this bird is dark spotted brown above, and striped white below. Its food consists of rats and mice, partridges and other birds, and insects. In winter it makes great havoc among the flocks of ptarmigans. It is a very bold bird, and has been known to pounce upon and carry away wounded game that had fallen before the sportsman's gun. Although so bold and so successful a hunter, the Hawk Owl is by no means a large bird, being only from fifteen to seventeen inches in length. The flight of the Hawk Owl is rather slow; at times it mounts to a considerable height; and it roosts sometimes on the ground in marshy situations, as do the Harriers. The note of this bird is said to resemble that of the Kestrel, which is clear, shrill, and rather loud.

The Snowy Owl is one of the handsomest of this group, not so much on account of its dimensions, but by reason of the beautiful white plumage with which it is clothed, and the large orange eyeballs which shine with a lustre as of a topaz set among the snowy plumage. The Snowy Owl may derive its name either from the colour of its plumage or the snow-covered regions which are its natural residence. It inhabits the Arctic parts of Europe, Asia and America; from these it advances more or less towards the south. In Europe it occurs in abundance in Kamtschatka and Siberia; in considerable numbers in Russia, Lapland, Norway and Sweden. This splendid Owl has been one of the oldest inhabitants of the Orkney and Shetland Islands. It has been killed in Northumberland, Norfolk, Kent, Dorsetshire, Cornwall and Suffolk. One was shot at Caithness, in stormy snowy weather, with a duck in its talons, which it had carried

off from a sportman, who had just killed it. Large flights of these birds were observed on the coast of Labrador, in November, 1838, on their migration. They accompanied the ship for fourteen days, and frequently alighted on the yards. The bird weighs from three pounds to three pounds and a half. The male measures from one foot ten inches to two feet; the female from two feet one inch to two feet three inches. The spread of the wings is about four feet nine inches in the male, and five feet two inches in the female. Bristly white feathers, pointing forwards, nearly hide the bill. The nest is made on the ground, or upon rocks, though sometimes, it is said, in trees, and is composed of branches. The eggs are white, and two, three, or four in number. The food consists of hares, rabbits, rats, lemmings, squirrels, and other animals; also capercailzie, ptarmigans, ducks, partridges, sandpipers, and other small birds. They also feed on fish, which they dexterously skim from the surface of the water, or sometimes, like other fishers, watch for them from the brink of a stream. Their mode, however, of angling, is in this case, as described by Anderton, a very peculiar one: "they approach the brink of a rock, lie flat down upon it close to the water, and when a fish comes within reach, strike at it with their talons, and secure it with this natural kind of gaff." In proportion to its size the Snowy Owl is a mighty hunter, having been detected in chasing the hare. According to Yarrell, the Swedish name Harfung, which has been given to this bird, is derived from its habit of feeding on hares. These birds hunt their prey by day as well as by night. They will sometimes approach a sportsman in anticipation of his furnishing them with food, and are not deterred even by the sound of the gun, but rather seem to consider it as a dinner-bell whose summons calls them to a meal. They have been known to carry off wounded grouse before the sportsman could secure his prey. Mr. Yarrell remarks that one, wounded on the Isle of Balla, disgorged a young rabbit whole. It is very fond of sandpipers, on which it pounces with precision and agility as it

skims along the marshes. The note of this bird is said sometimes to resemble the cry of a person in danger, but ordinarily it seems to resemble that of the cuckoo, but is shorter and quicker. They also hiss and make a snapping noise with their bills.

We now arrive at the second group of Owls, which are remarkable for two tufts of feathers which rise from the head, and occupy the same relative position as the ears of quadrupeds. These "ears," as they are called, have, however, nothing to do with the organs of hearing, but are simply tufts of feathers, which can be raised and depressed at the will of the bird. At present their use is unknown.

The Great-eared, or Eagle Owl, although seemingly to exceed the Golden Eagle in dimensions, is in reality a very much smaller bird, owing its apparent magnitude to its feathers, and not to its body. In weight it hardly exceeds one quarter of that of the Eagle, but in power of muscle it is little inferior to the royal bird itself. Indeed Mr. Nilsson states that it not unfrequently engages in combat with the Eagle, and that it often comes off victorious. The stronghold of this fine bird is the North of Europe. It inhabits Denmark, Norway, Sweden, Russia, Lapland, Germany and Switzerland. It also occurs in China, and other parts of Asia. In Yorkshire one was shot in March, 1845; another near Bradford, in 1821; another was caught in a wood near Harrogate; one in Lincolnshire; others have been met with in Kent, Sussex, Devonshire, Suffolk, Durham, Derbyshire, and one at Hampstead; but it is a very rare bird in England. It inhabits the depths of forests or wooded precipices during the day, hunting in the twilight. The general colour of the Eagle Owl is brown, mingled with a yellow tinge, and covered on the upper surface with bars, dashes and streaks of blackish brown. The facial disc is pale brown, decorated with many small spots of black. The long claws are black, and the beak is also nearly black. The eyes are of a bright radiant orange, and have a very fierce appearance when the bird looks the spectator in the face.

The weight of the male is about seven pounds, of the female between seven and eight pounds. The tufts are formed of seven, or eight to twelve, dark feathers, barred with light-brown on their inner webs; they are about two inches and a half in length. The wings are very large, broad, and rounded; they expand to the width of about five feet one inch, and their aspect when outstretched is truly magnificent. The nest is very large, and is placed on rocks or old ruins, amid the desolate sterility of the bleak hill or wild unsheltered mountain. It is composed of branches and sticks, and lined with leaves and straw. The eggs are two or three in number. The food of the Eagle Owl consists of even the larger animals, such as fawns and lambs, hares, rabbits, rats, mice, and moles; birds; capercailzie, pheasants, partridges, crows, rooks; as also snakes, lizards, frogs, and even insects and fish, all indeed seem to be fish that comes to its net. There is a strong connecting link between this bird and the Eagle. In moving on the ground, the action of this bird is by a series of jumps, aided by the wings—it does not walk. A Swedish gentleman resided several years on a farm near a steep mountain, on the summit of which two Eagle Owls had built their nest. In the month of July, a young bird, having quitted the nest, was caught by the servants. After it was caught it was shut up in a large hen-coop. The gentleman was surprised on the following morning to find a young partridge lying dead before the door of the coop, and this was continued for sometime. In the month of August the attention on the part of the old birds ceased; but this is the usual period when all birds of prey abandon their young to their own exertions, and usually drive them off to shift for themselves. The note of this bird resembles the bark of a small dog, varied sometimes by a hoot, accompanied by a snapping of the bill and hissing. The female has, in addition, a screech in the breeding season. The young utters a continual hissing and piping noise. The Eagle Owl is easily reconciled to confinement; and in two instances have been known to breed in captivity.

The Short-eared Owl, sometimes called the Woodcock Owl, is a migratory bird, and arrives in this country in October, about the same time as the Woodcock. It departs in March. This species is remarkable for the small size of the head, which is even smaller than the neck. It avoids the shelter of woods, and haunts heaths and open lands. It is found in Germany, Holland, most parts of Europe, and North and South America. The length of this bird is from fourteen to fifteen inches. Colour—the upper surface, together with the head and neck are fawn, covered with dark brown patches, the darker tint being placed on the centre of each feather, and the same around the edges; the whole of the under surface of the body is light buff, covered with longitudinal dashes of dark brown upon the breast, and with a few long streaks of the same colour uopn the abdomen. The tufts, which are placed near together, are composed of three or four feathers, the longest being less than an inch in length. The wings are long and broad, and expand to the width of about three feet. They feed by day, especially in dull weather. Its food consists of mice and birds; but Yarrell mentions that he has discovered in the stomach of one the remains of a bat, and a half-grown rat. One kept by Montague never drank for six months. It is deemed probable that they migrate in flocks, more or less large. On one occasion, in Ireland, thirteen or fourteen were seen together. They breed in Northumberland, Cumberland, and the northern counties, and may be considered, perhaps, permanent residents in the Hebrides. The young are often found on the Grouse moors in August; still in the main it is migratory.

The Long-eared Owl is plentiful in many countries of all the four quarters of the globe. In Europe it occurs in Denmark, Russia, Sweden, Norway, France, Italy, and in this country it is generally distributed, but is nowhere numerous, except in the North. It is not a very large bird, being only fourteen or fifteen inches in length. The colour of this bird is very handsome, but varies very much in the depth and tone of its markings. The

upper surface of the body is pale brown, diversified on the neck and shoulders by longitudinal streaks of black-brown; the upper surface of the wings is variously splashed with black, fawn and brown. The under surface of the body is greyish-white, intermixed with fawn and various longitudinal brown streaks. The facial disc is very conspicuous and complete, and seems to consist of two parts; the inner feathers almost completely hide the beak, whilst the outer part is a complete circle of yellowish-brown. The tufts are formed of from seven to eight or twelve feathers, an inch and a half or more in length, the hind ones being the shortest. The wings when closed reach a little beyond the end of the tail, and expand to the width of from three feet to three feet two inches, in the female a little longer. The eyes are of great brilliancy. They seldom build a nest of their own, but use that of some other bird or even a squirrel's. This Owl is not only a nocturnal, but occasionally, and even in bright sunshine, a diurnal feeder. It is very rapacious, and takes its prey as if it were a Hawk rather than an Owl. Its food consists of leverets, rabbits, rats, mice, moles, small birds, beetles, and other insects. Mr. Thompson, of Belfast, kept this species and the Short-eared Owl instead of cats, and found them more effective as destroyers of rats and mice. They were, he says, "very fond of having their ears rubbed."

The Scops-eared Owl is a native of the temperate parts of each of the four quarters of the globe. In Europe it occurs plentifully in France, Italy, Germany, Austria, and other countries. In England it is rare. It has been shot in Yorkshire, Sussex, Buckinghamshire, Scilly, near London, Worcestershire, Essex, &c. It is said to have bred in Durham and Sutherlandshire. The length of this tiny Owl is only seven and a half inches. The head is light brown, marked with several narrow brown streaks; the back is variegated brown and chestnut, marked with dark bands and grey mottlings. The under portions of the body are greyish-white, with several streaks and dashes of dark brown. The tufts have from six, or eight, to twelve feathers.

The wings expand to a width of one foot eight or nine inches. The food consists of mice, frogs, small birds, insects and worms. This species inhabits gardens and plantations, even in the neighbourhood of towns. According to Savi, this is the only Italian species which migrates; passing the winter in Africa and Southern Asia, and the summer in Italy and the South of France. Mr. Spence says that "it is very common in Italy in the summer, and is remarkable for the constancy and regularity with which it utters its peculiar note or cry. It does not merely 'to the moon complain,' but keeps repeating its plaintive and monotonous cry of Kew, Kew, at regular intervals of about two seconds, the livelong night; and until one is used to it, nothing can well be more wearisome." Mr. Spence says: "towards the end of April, 1830, one of these Owls established itself in the Jardin Anglais, behind the house were we resided at Florence, and until our departure for Switzerland, in June, I recollect but one or two instances in which it was not constantly to be heard, as if in spite to the nightingales who abounded there from nightfall to midnight (and probably much later), whenever I chanced to be in the back part of the house or took a friend to listen to it, and always with the same unwearied cry, and the interval between each as regular as the tickings of a pendulum."

Morris, in his Appendix, mentions the solitary occurrence of the Mottled Owl, near Kirkstall, Yorkshire, in the spring of 1852. There was another with it at the time, and no doubt from the season of the year they had been building or would have built; but every rare bird is so hunted "from pillar to post" that there is small chance of any increase of family. This bird is a native of Canada.

I have endeavoured, in as concise a form as possible, to give you some little description of the Natural History of this very interesting family of birds. I have had to condense it, as the subject is a large one, and to have gone into it more fully would have taken up too much time.

The paper was illustrated by living and stuffed specimens.

On Water Supply, principally as applied to Domestic Purposes.

By E. J. Morgan.

(Read January 14th, 1885.)

In bringing these remarks before the meeting I may mention that they consist chiefly of facts collected from the best available authorities, and that there is no claim for originality. The subject of water, and water supply, has been approached from all sides, and has been so thrashed out, as it were, that there is little room for novelty in dealing with the question; and it is doubtful whether, excepting the case of the improvement in filters, there has been any material advance in our knowledge during the last 40 years, or in the practical application of the principles admitted generally.

An abundant supply of water is one of the chief necessaries of life, and a most important condition of health. How essential is it, then, that this supply should be obtained from the best source and delivered in the purest state.

At all times, in all nations and climates, its possession has been looked to as the greatest blessing, its privation as the greatest curse. In Scripture the digging of a well is often mentioned among the most important acts of some great tribe. To destroy a fountain, as an act of vengeance, was counted a terrible crime among an Oriental people, which might call up before the eyes of its perpetrator the spectre of parched wretches laying themselves down to meet the most torturing death upon the burning sand.

Fountains of water were blessed by the priests among pristine nations, they were consecrated by the primitive church, and at the present day, in the British Empire, the name given to many wells, after some patron saint, represents a respect often older than Christianity, since, in many instances, the fountain had been worshipped in the old Pagan days and the Christian missionary

then established himself, in order that, where he found worship already bestowed, he might lead it in the right direction.

I propose therefore to consider the subject under the following heads :—

Sources of supply.
Quality of water supplied.
Distinction of hard water from soft.
Purifying water on a large scale.
Purifying water on a small scale by filters.

The water used for domestic purposes is derived from and dependent upon the rain-fall, whatever the immediate source, whether from wells, rivers, or springs.

Rain water may be considered as absolutely pure when collected away from the impurities which always exist, more or less, in the atmosphere of large towns; and were it possible to collect it in sufficient quantities under such conditions, no better water could be desired for *general* purposes, but practically this is impossible, and so we are necessarily driven to seek for other sources of supply.

One of these sources is that from wells.—The water obtained from wells, properly constructed, is usually clear and limpid, but, as in springs, it partakes of the character of the strata through which it percolates; and when derived from wells situated in towns or amongst buildings it cannot be held as desirable, on account of the danger of organic matter introducing itself. Such pollution has been found to exist when the infecting cause has been discovered at great distances, and only traced with difficulty—an instance of this occurred in the town of Croydon.

In the case of Artesian wells, where the supply is drawn from deeper sources, this danger of contamination may be disregarded; and where a sufficient supply can be obtained of suitable water, they have many advantages. It frequently happens, however, that after continued use the supply diminishes, and care has to be

exercised when applying such wells on a large scale as in the supply of towns.

A second source of supply is that from rivers.—Where it is possible to obtain a supply from rivers, absolutely free from the drainage of towns, influx of chemical works and other causes of impurity, no supply possesses so many advantages.

The water passing into rivers does not all filter through the ground, a considerable portion rapidly flowing over the surface and down the slopes of the hills; this being the case, river water is generally chemically purer than that of springs, as it has not the same opportunity for taking up the mineral impurities present in the ground.

River water being also exposed to the air, parts with some of the excess of carbonic acid, and this tends to soften the water.

Some authorities have great faith in the power of running streams in removing organic impurities; there is, however, considerable difference of opinion on this point.

The objections to river water are the occasional absence of limpidity, particularly during floods. The waters deposited by rain carry with them a certain amount of detritus and other foreign matter derived from the soil; this proportion is sometimes very considerable, and entails great expense in arrangements for filtering.

The water from rivers also varies much in temperature during the year, having a range of more than 30°; this would be a considerable drawback if the water supplied to our houses arrived at the same temperature as at the source.

That the temperature of water has an influence on health has been shewn by various authorities, the deaths from diarrhœa in districts supplied from rivers having been proved to be higher than in those districts supplied from springs of which the variation at the different seasons of the year is but slight; and when the temperature of the water reaches 62° the disease becomes epidemic.

An apparatus has been devised by Messrs. Latham and Way by which the temperature of the water may be rendered nearly uniform throughout the year. It consists of a tube sunk or driven into the ground to a depth of about 25ft,, the water to be cooled being admitted at the top and withdrawn at the bottom of the tube for the supply of the house. With this arrangement it has been found that the variation of the temperature of the water has been reduced to 3° throughout the year; this apparatus would probably be too expensive for the majority of private houses, but in many cases, such as for drinking fountains, would be invaluable.

The next source of supply is that from springs.—In cases where springs, fed by the infiltration of rain water, falling upon a large area, occur in abundance, and of the requisite quality, they may be held to offer the most desirable sources of supply, particularly in cultivated districts, because it is impossible to exclude drainage water from entering superficial watercourses, such as are used for supplying large reservoirs.

Of course it is important to ascertain the yield of the springs during a long succession of seasons. The Cycle of the climate in England is supposed to be of about 17 years' duration, and indications derived from gaugings over short periods are likely to prove misleading; the time of year will also affect the correctness of the observation. The most advisable time to measure the discharge, if taken within short periods, is during September and October, for during these months the springs are generally at their lowest.

Springs may be divided into two classes—land springs, and deep-seated springs—according to the structure of the district from which they take their supply.

Land springs are fed by waters falling upon loose permeable materials, lying upon a retentive substratum, through the former of which they descend until impeded by the latter, such waters not being under pressure do not rise above the ground.

Deep-seated springs derive their supply from the exposed surface of a stratum at a high level, then passing under an im-

permeable stratum, and lying upon another impermeable basin-shaped deposit, the water then follows the level of the lowest point of the permeable stratum just as if flowing on the surface. Should an opening be made through the overlying impermeable stratum the water rises to a height corresponding with the hydrostatic pressure, as in the case of Artesian wells.

Deep seated springs are naturally more constant in the supply they yield than land springs. In order to estimate this quantity very careful investigation is necessary, and it is a matter of great difficulty.

The next point is to consider the various qualities of waters, however derived.

Of ordinary waters, one varies from another on account of the different kind and different quantity of foreign matter that each contains. This foreign matter may exist in the water, either in a state of mixture or in a state of solution.

The matter contained in a state of mixture can generally be separated by subsidence or filtration.

Solid matter in a state of solution in any water is either mineral or organical. The most common kinds of mineral matters present are salts of lime and magnesia, and salts of potash and soda.

It is chiefly the presence of the salts of lime or magnesia that causes the water to be termed hard, the presence of the salts of soda and potash has no such effect; the amount of hardness, therefore, depends upon the quantity of lime or magnesia in the water.

Dr. Clark, some forty years since, proposed to express the amount of hardness in any water by the number of grains of lime contained in a gallon, thus water containing 20 grains would be reckoned at 20 degrees of hardness, and this expression has been generally adopted when describing the quality of water.

Dr. Clark, in further elaborating his experiments, shewed how this lime might be removed, and hard water rendered practically soft.

Chalk or carbonate of lime, when dissolved in water by the action of carbonic acid, becomes what chemists term bicarbonate of lime—one of the chief causes of the hardness of water.

Lime stone, or chalk when burnt in a kiln, becomes quick lime or caustic lime, having parted with its carbonic acid; a solution of this lime is called lime water and is of frequent use under this name medicinally.

Any lime water may be mixed with another, and any solution of bicarbonate of lime mixed with another, without any change being produced. If, however, lime water be mixed with a solution of bicarbonate of lime, the mixture becomes cloudy and white, and in time the white matter subsides in the form of chalk, leaving the water perfectly clear. The application of lime water to water containing bicarbonates forms the principle of Clark's process for softening water.

The process more in detail is this :—

One pound of chalk, when burnt, loses seven ounces in weight of carbonic acid driven off in the form of gas. This caustic lime when mixed with the hard water, recovers this seven ounces of carbonic acid from the water, and is deposited in the form of chalk, but the water in parting with this seven ounces of carbonic acid also leaves a deposit of one pound of chalk, thus two pounds of chalk will be found at the bottom of the cistern.

Water of the average hardness of that of Bath, contains nearly half a pound of chalk to 200 gallons of water; this amount may be assumed as the daily consumption of an ordinary household, thus in addition to the water supplied by the Corporation of this City we are presented besides with half a pound of chalk, which, for my part, I would gladly dispense with.

The amount of lime in the water supplied daily in this City is probably not less than from one to one-and-a-half tons.

It is perhaps not so generally known that the mere boiling of hard water very much reduces its hardness. This is fortunate in some respects, otherwise, in many places, the water would be quite unfit for culinary and household purposes.

In an experiment which may be considered an average one, before boiling, the hardness of the water was $18\frac{1}{2}°$

After boiling 4 minutes, ... 9
„ 8 „ ... ... $7\frac{1}{2}$
„ 12 „ ... ... $6\frac{1}{2}$
„ 16 „ ... ... $5\frac{1}{2}$

The hardness removed by boiling is called the temporary hardness, that which remains—the permanent hardness.

Here it may be noted that soft water is not the best for making tea, for it draws out the woody flavour. This was observed by M. Soyer in the course of his experiments on tea-making.

The use of soda neither improves the flavour nor the strength, it merely deepens the colour, although popular opinion has always, and does now, maintain the contrary.

We can well understand how it is, that when a town is supplied with water abounding in bicarbonates our boilers and heating apparatus suffer; the water is benefited at the expense of the vessels in which it is heated, pipes are furred up, and frequent inspection and cleaning necessary to prevent danger. I believe that this cost alone would more than meet the expense of applying a general system of softening the water of the town.

Purifying water on a large scale.—Up to the present time this has been almost limited to the construction of filtering and settling beds attached to the reservoirs, and little has been done beyond the mere mechanical treatment of the water, and even this is very inadequate, owing to the fouling of the filtering media; but the time appears to be drawing near when the subject will be taken up by the public generally, and some method insisted on by which the chemical as well as the mechanical impurities of the water may be removed.

Some few towns have adopted one of the systems now being recommended, amongst them Canterbury and the town of Henley-on-Thames, and the results have been eminently satisfactory.

As a rule Water Companies are against improvements. One patentee of an improved system of softening water on a large scale, in fowarding his pamphlet, writes as follows :—

"I am never very hopeful of an old established company taking "it up, they say we should not be allowed to charge the public "any more than now, and we will insist that our water is good "and sufficient as it is." It appears, therefore, that any movement must take place from the outside, and those interested in the provision of the supply are not at all likely to stir in the matter.

The Royal Commissioners in their Report, in the year 1874, upon the Domestic Water Supply of Great Britain, said as under:—

"Hard water not only acts injuriously when used for washing "(10 gallons of water, the hardness of Thames water, causing the "waste of nearly $\frac{1}{4}$ lb. of soap), but when it is employed for the "generation of steam it forms troublesome and dangerous in- "crustations in the boiler. A constant supply of hot water has "become almost a necessity in every household, but great "difficulties are thrown in the way of its attainment by the "supply of hard water to towns, owing to the formation of "thick calcareous crusts in the heating apparatus. Waters which "have much temporary hardness are most objectionable in this "respect, and the evil is so great, where the heating is effected in "a coil of pipe, as practically to prevent, in London for instance, "the use of this most convenient mode of heating water."

London, unfortunately, does not stand alone in this respect, and notwithstanding the report of the Commission, it seems to have had little effect in improving matters up to the present time

There are several systems now before the public, the chief of which are those of Atkins, Porter Clark, Maignen, and others. Atkins' plan is used at Henley, that of Porter Clark is not yet in use at any large town but largely adopted by railway companies at home and abroad, and at various breweries and mills. The London and North Western Railway prepare 1,000,000 gallons daily at four of their stations.

Maignen, whose filters are now so much heard of, is also introducing a system for softening water on a large scale.

All these plans are, however, based upon the original discovery of Dr. Clark, and depend more or less upon the application of his principle, with this addition that he merely sought to get rid of the bicarbonates, whereas, by an addition of various chemicals, adapted to the particular quality of the water, other chemical impurities of the water, chiefly the sulphates, can be removed.

Now that so much attention is being drawn to the question, we may hope that before long excessive hardness in the water supplied will become a thing of the past; and the next generation will be astonished that the inconvenience was so long submitted to by their patient and long-suffering fathers.

Here I should like to introduce a few remarks on the analysis of water. It is generally supposed that an analysis by a skilled expert is sufficient to protect the inquirer from any ill effects likely to arise from the water analysed when pronounced fit for use. That this is not altogether the case, however, appears from the following extracts on the point.

In a paper read lately by Mr. Folkard, a skilled chemist, he made these remarks:—

"Analytical chemistry, as far as mineral substances are "concerned, is in a very advanced stage, not so with organic "chemistry, dealing with the tissues of plants and animals."

Mr. Baldwin Smith, as the result of a long experience of the subject and knowledge of the opinion of many eminent chemists, concurred with the author of the paper, that the chemist was unable to determine whether water was wholesome or not.

Dr. Franklin said that chemical analysis is unable to detect those small quantities of morbific matter which are calculated to transmit disease to people drinking the water.

The Report of the Commission on River Pollution says, "The existence of an infectious property in water cannot be proved by chemical analysis."

It becomes, therefore, doubly necessary that we should be able to trace with certainty the flow of water from its source until delivered at our houses, in order to feel sure that it runs no risk of contamination by the way, for purity of source and surroundings of the water supply for domestic use must be regarded as paramount to anything that chemistry may be expected to reveal.

We will now deal with the water as delivered in our houses. Supposing it to be advisable to soften the water—and we are willing to incur the expense—there are several systems by which we can have all the water for domestic purposes softened and filtered in our own homes. The Porter Clark arrangement and that of Maignen both succeed in effecting this improvement. The fittings, however, are somewhat troublesome to arrange, and a certain amount of supervision and attention is necessary to ensure the efficacy of the working.

It is advisable in all cases to filter the water supplied by the mains, when required for drinking; this is doubly necessary in the case of an intermittent supply when the water is stored in cisterns. These cisterns are a fruitful source of impurity, and are as a rule placed in the most out-of-the-way places, as if on purpose to increase the difficulty of cleansing them; and instead of one main cistern, in many cases there are several subsidiary ones.

This leads to the subject of filters.

Filters seem to have been in use from a very early period, as they were known to have existed both amongst the Japanese and Egyptians. These filters were made of stone or unglazed earthenware. Filters of dripstone have been commonly used both in the East and West Indies.

The first improvement on the stone filters seems to have been the use of charcoal and sand as a filtering medium, and various adaptations of these substances have formed the materials of which filters have been constructed up to a recent time.

Such filters are now quite out of date, as they have proved mere traps for collecting impurities, the filtering medium being

enclosed in the vessel with a cemented cover. It was found that the impurities deposited remained and accumulated, and there was no way of properly cleaning the filter. Animal charcoal after a time loses its properties, and actually gives back the impurities collected to the water; it is also found to favour the growth of the low forms of organic life. We may therefore safely conclude that it is well to avoid the use of filters that are based upon the employment of charcoal only.

There has been of late years a great advance in the construction of filters, and their number is legion. I propose, therefore, briefly to note a few.

Doulton's Manganese Carbon Filter.—One improvement in these filters consists in the fact that every drop of filtered water becomes available owing to the floor of the reservoir being formed with a slope towards the tap; in most filters this is not the case, consequently the lowest stratum of water may lie unused, long enough to become positively harmful through the introduction of germs, which usually gravitate to the bottom of the water.

This filter, though classed among the block system, claims to be exempt from the disadvantages attendant upon the use of charcoal in the ordinary block filters, and neutralizing the property that animal charcoal possesses of favouring the growth of low forms of organic life; in porous blocks after a time the purifying power becomes diminished, and water left in contact with the medium is apt to take up impurity again.

The principle of this filter is the combination of manganese with carbon in the block, and this professes to prevent the growth of organisms and also to improve with use.

Silicated Carbon Filter.—This is another filter on the block principle—the block is formed of a mixture of carbon, iron, silica, and alumina. Professor Wanklyn states he has such confidence in this filter, that he has passed a solution of strychnine through it and drunk the filtrate. This filter claims to remove lead and also to soften the water appreciably.

Spongy Iron Filter.—Spongy iron has been lately discovered to be a filtering medium of great value; water passed through it has been found to be entirely free from bacterial germs, and it is the only known substance applicable to the treatment of large volumes of water which immediately destroy living bacteria.

Spongy iron is metallic iron in a state of exceedingly fine division, which renders it sufficiently porous for water to percolate. It takes the place of carbon in other filters, it counteracts lead contamination, reduces the hardness of water, and needs cleansing only once in 12 months.

Spencer's Magnetic Filter.—This filter is very much in request, and claims to possess superior advantages, probably, however, it produces much the same results as the spongy iron filter, but there is little doubt that no other filter surpasses, if it equals, this invention in its chemical action upon water.

The substance used is called "magnetic carbide," or in chemical language "magnetic protocarbide of iron." Magnetic oxide of iron is made to combine with a small portion of pure carbon.

The inventor states that he was led to the discovery by noticing that where magnetic oxide of iron existed in the strata, there the spring water was purest; where deficient, the water retained the organic impurities it had acquired on the surface.

Malvern is quoted as an instance of the purity of the water, owing to the presence of this.

The new red sandstone as deficient.

Maignen's Filter Rapide.—This is the last of the new type of filters of the present day. It will be known to the visitors at the Health Exhibition as having supplied the drinking fountains.

The mechanism of this filter consists of a funnel pierced by apertures, over which an abestos cloth is fitted, and the filtering medium deposited uniformly over the whole of this surface. The filtering medium is a mixture of carbon and lime in a minute state of subdivision, one square inch of which—1-8th of an inch in thickness—is said to spread over 200,000 square inches of

straining surface. This is supposed to prevent the passage of even the smallest germs.

The filtering medium removes iron, lead, sewage, ammonia and sulphuretted hydrogen, and reduces the hardness to some extent.

In conclusion, I think we may fairly assume that we have arrived at the following results :—

That the water supply of large towns is generally in an unsatisfactory state.

That only the mechanical impurities of the water are sought to be removed by filtration.

That this filtering is insufficient for the purpose intended, owing to the fouling of the filtering media, and the difficulty and expense of cleansing.

That when chemical impurities exist, and amongst these I include excessive hardness of water, no efforts are made to remedy the evil.

That chemical analysis is unable to pronounce absolutely upon the wholesomeness of the water supplied.

And, lastly, that in all cases it should be held as a primary condition that the water supplied for domestic purposes should not exceed a specified standard of hardness, and that all water for drinking purposes should be properly filtered before use.

Summary of Proceedings for the year 1884-85.

Mr. President and Gentlemen,

An anniversary dinner did not inaugurate the proceedings of the past year; owing probably to the fact that the usua place of meeting was not available, only three names besides those of the officers were sent in—the Committee were, therefore, obliged to give it up by the pure force of circumstances.

AFTERNOON MEETINGS.

These have been very fairly attended throughout the season. The first was held on March 12th, when Canon Ellacombe presided, and Mr. Allon Tucker read a paper on the "Remains at Stanton Drew" (vide p. 257). Prefacing his paper by remarking that so much had been written on the subject that there was little room for originality, he, in the first place, touched on the meaning of the word Stanton, of which there were many examples in the manor of Keynsham, and then of the other word Drew, which of course had no reference to the so-called Druids, but was of quite a different origin. He then gave a description of the stone circles, and the various other stones scattered about—their position, size, and composition—and concluded by bringing in review the various suggestions of the purposes for which they were erected.

Mr. Dymond, who had written papers for the Proceedings of the Somerset Archæological Society and the Archæological Association on these circles, and was called on by the Chairman, to give his views as one well versed in the subject, said that he quite corroborated Mr. Tucker's view that the Cove had never been a Dolmen, and that the third stone now fallen could never have been a top-covering stone. He considered that much less change than has been commonly supposed had occurred in the position of the stones since Aubrey's time, and that he had, with

the aid of the Vicar, accounted for all of those that remain, making a total of 66 in number. As to the purposes for which such groups of stones were arranged, he thought that from an original symbolic origin they subsequently developed into uses judicial as well as funereal and memorial.

The Rev. H. H. WINWOOD, having been called on by the Chairman, said that he congratulated the Club that one of their younger members had given so careful and judicious a paper, merely stating the plain facts of the case without launching out into any fanciful theories; with regard, however, to one point he must demur. Mr. Tucker had spoken of one of the stones being "Limestone," and having a "shell" in it. Now he thought it would be safer to say that they were all a Conglomerate. He had never seen any one of the stones there that could be called a "Limestone," and as to the shell he challenged Mr. Tucker to show him one. They probably came from the neighbourhood, and were a peculiar form of the Conglomerate which fringed our Mendips. At the same time it was an object worthy of the members of the Club to try and ascertain whence these stones came; they were probably not far off. One other point as to their future preservation—he stated that during a recent visit there with General Pitt Rivers, the Government Inspector of Ancient Monuments, arrangements were made for their future security, and they were in the process of being scheduled amongst the other remains in the county worthy of preservation.

The CHAIRMAN returned the thanks of the Club to Mr. Allon Tucker for his paper, and the judicious restraining of his fancy from going into theories. As to the name of Drew being derived from a family of that name, he would mention one fact in corroboration. Drew Steignton, a well-known place in Devonshire, was the same name slightly altered, and records show that a family of the name of Drew, who lived in Exeter, was connected with that place. There was yet another derivation he could venture to give. Drew was the old name for a stream, and the

little river Chew ran close alongside. The word was to be found, but somewhat hidden, in the word Derwent. "Stanton," he thought, was connected more with a Roman station than a paved road; the word "Stratton" was more likely to suit the latter idea. The remains nearest allied to this were the standing stones of Stainness (a stony promontory instead of a stone village or town). There was a Maes How near Stainness as there was a Maes bury near Stanton, and moreover there was a single stone corresponding with "De Hauteville's quoit." In conclusion he ventured upon some theories of his own as to the date being post-Roman, and said his views were held by others, whose opinion was of weight in these matters.

Mr. Russell Duckworth concluded the afternoon by some "Hints for a Walking Tour," as to companions, route, knapsack, books, clothes, &c., and elicited several remarks from members in reply. The following is an abstract:—

1. *Companion.*—Only one, well known, good-tempered, healthy, unselfish, plucky, walking one's own pace.

2. *Route.*—Fix some weeks beforehand, not spend half your time in getting to starting point.

3. *Knapsack.*—Thoroughly waterproof, lock secure against thieves and upsetting, broad straps, chest strap, weight well on shoulder.

4. *Books.*—Note book for Field Club, &c., &c.

5. *Shoes.*—Lighter, freer, less confining to perspiration than boots. Add short gaiters for sand and wet, sprig nails, old evening boots for second pair for in or out of doors in the evening, or also instead of slippers.

6. *Short walk the first day.*—To get into order.

7. *Socks.*—Less bulky than stockings in knapsack, well-fitting, soap or oil foot before starting, if sore with walking on the previous day.

8. *Shirts.*—Two flannel shirts, one for day, one for evening and night.

9. *Start on Tour in fair condition.*—Practice long walks before hand.

10. *Plaid.*—To sit on when ground damp; to sleep on when sheets damp.

11. *Compass.*—Necessary in fog, &c.

12. *Lucifers.*—Awkward if not provided by hotel.

13. *Thirst.*—Prevent (1) by not eating or drinking salt or very sweet things, (2) by wearing no collar. Cure, by washing out mouth before drinking. If hot, save chill by drinking out of the hand.

14. *Stiffness.*—Removed by warm water for feet at end of day's walk.

15. Take *watch key.*

Mr. D. WILLIAMS intended to exhibit some fossils, &c., illustrating the bed of the sea, but was unfortunately prevented doing so by illness.

The second meeting took place on Wednesday afternoon, Dec. 10th, and was devoted entirely to subjects of Natural History. Colonel COCKELL took the chair in the absence of Mr. Skrine and opened the meeting by calling attention to the communication about to be given by the President on a "Second Capture of the rare Longicorn in Bath." This rare specimen of the Longicorn, taken in Bath on the 29th of October last, is rather larger than the one taken last year, and was found in a timber-yard in the Bristol-road and supposed to have been imported in the timber, which was from America, in the larva state. (Reference for further particulars *vide* p. 264). Specimens of the beetles were exhibited, and Mr. WILLIAMS then gave his paper on the "History of the British Owls" (*vide* p. 267). Referring to a recent remark of the President that natural history was very much neglected in the club, he said he had been induced to bring the present subject before the members. Alluding to the derivation of the word "owl," he at once entered upon the description of that bird. Though formerly considered as nocturnal hawks, they

are now generally arranged in two groups—the horned owls, those having ears or egrets, and those without these appendages. Mr. Williams then proceeded to give the economy of the owl, the eyes, facial disk, ears, plumage, and feet, illustrating his remarks by some beautifully stuffed specimens—of which there were eight out of the ten species known—their habits, haunts, method of eating food and of fighting were described, and some interesting anecdotes concluded an instructive paper. Two live specimens of the brown owl were exhibited.

The PRESIDENT congratulated Mr. Williams on his paper, and hoped that it was only an instalment of future papers on Natural History. As to the ten species of owls enumerated by Mr. Williams, four only—the white, brown, and the short and long-eared owls—may be said to be common, the other six were not so common. The ears or egrets, he took the opportunity of saying, are considered of no value in classification. In Tengmalm's owl, the two ears are symmetrical to the extent of affecting the cranium. Having had exceptional opportunity of observing the habits of the barn or white owl, a pair of which for some time used to have their nest in the roof over his bedroom, he corroborated Mr. Williams' remarks on them. Often had he watched them glide away in the dusk every evening to search the fields for mice, and timing them with his watch had ascertained that they returned every five minutes with a mouse in their claw, which they shifted to the beak for the purpose of better access to their nest. From the pellets which they rejected, their food was in every case field mice or voles, whereas the food of the brown owl is more varied. The short-eared owl was a migratory bird, and followed the mice wherever they were—indeed, as the plague of voles increased, so did the number of owls. Shrew mice were often found at the foot of the nest along with the pellets, but which were never eaten, and in consequence rejected. Wherever there is a plague of voles, as there often is in one or other parts of this country, short-eared owls appear in

abundance in the autumn attracted by the large supply of their natural food, and the same circumstance has been recorded with respect to the snowy owls in the north of Europe, following upon the migrations of the Lemming.

The third afternoon meeting was held on Wednesday, 14th of January, under the chairmanship of Mr. Skrine, when Mr. Morgan contributed a paper on "Water supply, principally as applied to domestic purposes" (*vide* p. 285), and Mr. Clarke gave a "Sketch of a trip in the s.s. "Ceylon" to the North Cape and Iceland in the summer of 1884."

Disclaiming any originality in his remarks, Mr. MORGAN stated that an abundant water supply is one of the chief necessaries of life, and a most important condition of health. How essential was it, then, that the supply should be obtained from the best source and delivered in the purest state! Sources of supply—quality of water supplied—distinction of hard water from soft—purifying water on a large scale—purifying water on a small scale by filters—were the five heads into which he divided his subject. Rain water, of course, was the purest if collected away from the impurities of towns. Of the three sources—wells, rivers, or springs—the latter offer the most desirable sources of supply, and are either land springs or deep-seated springs. Explaining the *raison d'être* of springs, he proceeded to speak of the quality of the water depending upon the foreign matter contained therein, either in a state of mixture or solution; the hardness of water being expressed by the amount of grains of salts of lime or magnesia contained in a gallon. With regard to the hardness of the Bath water, he considered that there was about half a pound of chalk to 200 gallons of water, and that the amount of lime in the water supplied daily is probably not less than from one to one-and-a-half tons. Proceeding then to describe the principle of Clark's process for softening water and the difficulty in getting water companies to adopt improvements, and enumerating the several systems of purifying water before the public, he spoke

of Atkins's, a modification of Clark's system, now adopted by the Southampton Water Company, as the best in his opinion. This paper, which was of considerable interest in connection with our own water supply, caused an interesting discussion, in which the Chairman, Capt. Lysaght, Mr. Winwood, and others took part.

Mr. SKRINE mentioned a curious fact in connection with a fish-pond on his property. After several vain attempts to keep gold and silver fish therein, owing to the extreme hardness of the water, it occurred to him to throw in a quantity of Fuller's-earth. This had the desired effect, the fish flourished, so did the weeds, which had before died off. He found, too, that the cattle liked the water better that burst forth from the top zone of the hills in the region of the Fuller's-earth. Was this owing to the water being softer? If so, might not Fuller's-earth be applied to soften the water for domestic purposes? Mr. Skrine also spoke of the advantage of storage of water on high ground.

The SECRETARY said the club was indebted for this valuable paper to observations made during some walks of the club last autumn, when, under Mr. Alfred Mitchell's guidance, they inspected the Corporation Waterworks at Monkswood and S. Catherine's valley; and he wished to take this opportunity of urging the members and others to turn their attention to the water supply of Bath. The city had by the recent rains, which had only temporarily supplied the land springs (*i.e.* the surface springs) alluded to in the paper, escaped a calamity—but a great inconvenience from the short supply many had not escaped. The deep-seated springs which had been so seriously affected by the smallness of the rainfall during the year just passed, had hardly been touched as yet, and unless the deficiency should be supplied by the rainfall during the coming winter months he feared the water supply would be still more inadequate for the wants of the city. The storage capacity at Monkswood and elsewhere was, in his opinion, not large enough to husband the excellent water which was constantly running to waste. There was another point

he wished to allude to. In the paper Mr. Morgan had spoken of the difficulty of gauging the deep-seated springs. Well, he had been very anxious to ascertain whether the recent excessively dry year had in any way affected their hot water supply as to quantity or temperature, but upon making inquiry of some of the authorities he failed to ascertain that any scientific record had been taken at stated times during any long period. He thought this defect, if true, ought to be remedied by our civic authorities, and a record carefully taken and reasonable access obtained to such on application.

Capt. LYSAGHT said he was glad of this opportunity of stating that the authorities were fully aware of the state of the case, and that he had listened to Mr. Morgan's paper with great interest. The hardness of the Bath water was only too well known from the inconvenience and expense attending the calcareous deposits in their mains and pipes, and the adoption of Clark's or any other system was only a matter of cost. The shortness of supply he attributed greatly to the waste in private houses, which was quite 50 per cent. The purity of the water was undoubted; did any foulness ever exist, it was in all cases traced to the dirty state in which private individuals allowed their cisterns to remain, of which he gave several instances. As to the necessity of greater storage capacity, he disagreed with the views expressed by the Secretary and Mr. Skrine, and gave no hopes for any further extension in that way, unless public opinion was brought to bear upon the authorities.

Mr. CLARKE concluded the afternoon by giving the following interesting sketch of a trip he had, during the summer of 1884, made to the North Cape in the s.s. "Ceylon."

It has been suggested that a short account of a trip taken in the summer of last year, to visit the Northern Latitudes, and to view the midnight sun, might interest the Field Club. The purport of the voyage was to visit Copenhagen, to take the West Coast of Norway, calling at towns *en route* to the North Cape, thence to Iceland. On

the return, to view the shores of Faroe, Shetland and the Orkney Islands, and this programme was as far as possible strictly adhered to.

The steam yacht "Ceylon," belonging to the Ocean Steam Yachting Company, was the vessel in which I embarked on the 23rd day of June, 1884. As arranged, she left her moorings at Gravesend, punctually at 2 p.m. of that day, and proceeded to Scarborough. We remained there some hours, and many of our voyagers landed. The boats having returned to the ship, bringing several new passengers, the start was then for Leith, where we arrived early the following morning, being thus enabled to have an entire day in Edinburgh. I need not enter into a description of its various sights, as most of those present have probably been there. In the evening, with an accession of new faces, we left for Copenhagen. On the morning of the 27th we passed Elsinore, a fortress of great strength, on a point of land jutting out into the sea with fortifications more than a mile long, and guns on every side commanding the Sound. Denmark holds her status in Europe by right of this fortress, the Dardanelles of the north ; later in the day the palaces and steeples of Copenhagen appeared in view. Shortly afterwards we dropped anchor, and lost no time in going ashore. The chief city of Denmark contains a population of 233,000. The palaces (one of which has been recently burnt), public buildings, galleries and museums, render this a very agreeable sojourn, but the most interesting to the visitor is the Thorwalsden Museum, consisting of works of Art by the sculptor himself and left by him to the Danish nation. The museum contains about 40 rooms decorated in the Pompeian style, with numerous corridors, galleries and halls for colossal statues. Through these are distributed about 600 of Thorwalsden's works—a splendid result of one man's genius ! The tomb of the artist, who died in 1844, is in the midst of the court yard of the museum—a simple massive marble sarchophagus, covered with trailing ivy, and bearing no inscription save the name that has made Denmark illustrious. Another great attraction is the museum of Northern Antiquities, unrivalled in its kind, and containing collections of stone weapons, ornaments, &c., to 500 B.C., bronzes to 500 A.D., and articles wrought in iron, gold and silver to 1,000 A.D. Copenhagen is the centre not only of Danish, but of Northern literature and art, and is the seat of a number of societies for the advancement of these in all their branches.

Our departure was next for Gothenburg, where we arrived the following morning; but little of this town was seen by the majority, as an object of supposed greater interest was to be found in a visit to the Trolhattan Falls, 50 miles distant. These Falls form the outlet from Lake Wener; the stream from thence to Gothenburg taking the name of the river Gota. By means of this river, lake and canal, with its series of locks, communication is obtained with Stockholm. Two steam launches were chartered for this trip. One leaving before the other, the start taking place between 11 and 12, and the destination reached about 6, wind and stream being against the boats. Those in the first launch, consisting of 20 in number, had arranged their party before the second was thought of, and went on their own responsibilities. No. 2, in which I was, and our party numbering only 13, was fortunate in having the creature comforts well considered. Two stewards from the "Ceylon" accompanied the boat with a plentiful supply of provisions. We both lunched and dined on board as comfortably as we should have done in our temporary home. The Falls are well worth seeing, various streams from them being utilised for the purpose of sawing mills. Bridges are thrown across the streams to view the Falls at the best advantage, and sundry look-out stations on the river banks, one of which embraces a view of lake Wener.

Owing to the heavy rain we left the neighbourbood of the falls and made our way back to the boat at 8.30 p.m., passing many vessels on their way to Stockholm, and boarded the "Ceylon" at two o'clock in the morning. Two hours afterwards we left for Christiania, the capital of Norway. This lies at the head of a fine fiord, 80 miles in length, with many towns on either side. The voyage all the way up from the entrance of the fiord affords a moving panorama of lake scenery, unique in character and of considerable beauty. The Christiania fiord is the centre of the so-called Wenham Lake ice trade. The ice comes from numberless small lakes scattered about the country near the fiord. It is kept free from snow during the winter, the surface marked out into squares, cut to the depth of six inches with the plough, and the blocks detached with wedges. They are then packed with layers of sawdust, to prevent congealing, and then stored. The town of Drobak is the principal seat of this trade. The ice from the depôts is sent down to the wharves by a long series of pine trunk troughs.

The city of Christiania itself is comparatively modern, the seat of the

Norwegian Government, the Storthing, and the Superior Courts. The principal buildings are the Palace, the Castle, Augershugs, the Library with 120,000 volumes, the Military Academy, the University, the Houses of Parliament, the Custom House, the Hospital, and the Cathedral. Frogner Sœteren, five miles distant, should not be omitted by the visitor. It is a chalet N.W. from Christiania 1,600 feet above the sea level, a beautiful drive through a large and dark forest by a road built at heavy cost by the proprietor. In clear weather the snow-capped mountains of Valdens and Tellemarken to the west are visible, whilst to the east the view extends to the frontiers of Sweden.

The Viking Ship at Christiania must not be forgotten. It is an especial object of interest, and was discovered at Mydan S. Jutland in 1863. It is built of oak, propulsion being by 14 oars on each side. Its length is 80 feet, width at broadest part 11 feet, and the oars are nearly 12 feet in length and supposed to be 1,000 years old.

A visit was paid to the Museum, Storthing, &c., and then the "Ceylon" left for the Hardanger fiord, an inland sea lake, with its numerous arms and branches penetrating far into land, presenting many of the grandest and most characteristic features of Norwegian scenery. It is separated from the Siogne fiord by ranges of mountains with small short fiords running up between them. It is a great contrast to the grandeur of the Siogne fiord with its waterfalls and cascades plunging down the mountains. As at the foot of the overhanging glaciers, the hills are covered with woods and orchards, presenting a richness of foliage rarely seen in other parts of the country. At the entrance of the Hardanger fiord on the right is Rosendal, a small town surrounded by beautiful scenery, and possessing a fine old church of the early English style, having near it the baronial house of Rosendal, one of the few manorial houses now remaining in Norway, and belongs to the Rosenkrone family. Behind Rosendal stands in all its grandeur the Melderskin rising to the height of 4,550 feet, and at its base is a large tract of cultivated land.

The "Ceylon" for the night anchored at Odde, the southernmost part of the Sör fiord—a branch of the Hardanger fiord. This sheet of water is about 25 miles in length, and varies in breadth from one mile to a few hundred yards. It runs nearly north and south, and is separated from the main fiord by a mountain range crowned by the snow fields and glaciers of Folgefonn.

The following morning we left this for our next destination—Bergen, but our arriving there on a Sunday morning and leaving at midday did not afford more than an opportunity of seeing tolerably silent streets and the interior of churches, at which the population were at their devotions. At 11 p.m. the ship anchored at the Esse fiord, one of the branches of the Siogne fiord, under snow-capped mountains. Early the next morning a few of the party endeavoured to get at their summits, but did not succeed ; others were satisfied with wandering along the shore. Here I obtained specimens of the "Turritella imbricata" from the mud adhering to the anchor, and intended them for the museum at the Bath Literary Institution, but found better specimens were already there. The "Ceylon" steamed for some distance on the Sogndal fiord to give the visitors the opportunity of viewing the waterfalls and the glaciers which were much appreciated. The vessel was then headed for Trondjhem (Drontheim). To our great disappointment we were not enabled to enter the fiord leading to Drontheim owing to the denseness of the fog. After waiting two hours and with no chance of its clearing, the word was given to go ahead for Tromsö.

At 5.30 p.m. we entered the Arctic circle lat. 66 N., 32, or 1408 geographical miles S. of the Pole. Shortly after the great object of our voyage—the Midnight Sun—was seen to perfection. This was off the entrance to the Loffoden Islands, and at no great distance from the Maelstrom, lat. 67, 50. The sun at midnight is always north of the observer. It seems to travel round a circle requiring 24 hours for its completion, it being noon when it reaches its greatest elevation and midnight at the lowest. We thread our way through these islands which are very numerous, rugged and mountainous and stretch S.W. and N.E. for 175 miles. Some of the eminences in Vaagen attain an altitude of 4,000ft., and are covered with perpetual snow. It is in the neighbourhood of the Loffodens that the millions of cod are annually caught, forming the staple article of trade in the towns upon the West Coast.

Tromsö, which was next reached, is the capital of Norwegian Lapland, and contains about 5,000 inhabitants. The town is pleasingly situated on the east side of the island, from which it takes its name. There are extensive fisheries along the coast and a lucrative branch of industry is thus created. The Cathedral, being the See of a bishop, is a neat building of wood. A Lapp Encampment is seen in Tromsdal on the

east side of the fiord. These Lapps are accustomed to tourist visitors, and for a small fee will bring the reindeer for their inspection, but a previous arrangement must be made. On our visit, reindeer about 150 in number, were shown in an enclosure formed for the occasion, where we saw the process of lassoing, milking, harnessing, &c., and an opportunity was afforded of purchasing reindeer skins, tobacco pouches, horn spoons, and such like.

In the evening we left Tromsö for Hammerfest. This is celebrated as being the most northern town in the world (pop. 2,125) and also for its extensive trade, being the resort of English, Russian, Dutch, Swedish, and Danish, but particularly Russian. The town is infested with the odour of cod liver oil, prepared here in large quantities. The quotation from Shakespeare (Tempest) "a very ancient and fish-like smell" was frequently bandied about amongst the passengers. The Russian Government takes great pains to foster its trade with the northern provinces which are mainly supplied with corn from that country.

At 3.30 a.m., on July 13, we were off the North Cape. This rises sheer from the sea and perpendicular in some parts to the height of 1,004ft. It was very foggy on arrival, but fortunately before our departure, after a two hours' stay, the fog lifted and enabled us to have a good view of the headland, which is situated at the extreme north point of the island of Mageroe. Our route was then to Honningsvaag, a small fishing-station, where we anchored. This was for the purpose of enabling those who wished to be on the highest point of the North Cape, a walking distance of 12 miles and over a rugged way, to do so if desired. Whether from the swarms of mosquitoes prevalent in these parts, or disinclination for the walk, the passengers were satisfied with the view of the Cape from the sea. Many, however, landed and had a view of the barren country and climbed hills about 1,200ft. in height, from whence they supposed the North Cape was seen in the distance.

At 5 p.m., July 13th, we left for Iceland again passing Tromsö early the following morning. At night the sun was visible until 11.30 p.m., but a bank of clouds prevented our again seeing it at midnight.

There is nothing now to remark upon in our voyage, beyond the occasional spouting of a whale and the sight of a few sea birds. The ocean was very desolate of ships. Whilst coasting along Iceland glaciers were seen stretching down to the shore, and an indistinct glimpse of

Hecla was obtained. On our way to Reykjavik, Iceland's capital, an iceberg was said to be in sight. As we gradually approached it the illusion was dispelled, it being the summit of Snœfell—a mountain 5,960ft. high, and covered with perpetual snow. We had seen it, in the first instance, at a distance of 70 miles. In this 4½ days' steam a little excitement was got up in the shape of seamen's sports, races, jumping in sacks, tug of war, &c., and the ladies on board contributed their quota by an egg race. This is carried out by obtaining hard boiled eggs and a tea spoon attached to a handle about a foot in length, with this to take up an egg, deposit it at certain chalked lines on the deck, and to again take it up until arrival at the goal. The prize was half-a-dozen pairs of gloves, and the fortunate receiver was the one who did it in the shortest time. Arriving at Reykjavik on the 11th July, our stay was nearly four days. Reykjavik, pronounced Rikavik, is the residence of the Governor, the seat of the Supreme Court of Judicature, and an Episcopal See. The principal street extends along the water side, and is continued for about half-a-mile beyond the business part of the town. There are several other streets, all of which contain a few good houses, some of stone, but the great majority of them are wooden buildings. The finest edifice in Iceland is that where the Althing (Parliament) meets, and is substantially constructed of stone. It also contains the Museum of Antiquities. The Cathedral is a building capable of containing 500 people. The Post Office is on one side of the square, and in the centre stands a fine statue of Thorwalsden. The interior of the island is wild and desolate. It is covered by lofty mountain masses of volcanic origin, many of them crowned with perpetual snow and ice, which, stretching down into the neighbouring valleys, form immense glaciers.

These icy mountains take the common name of Jökull, and the highest are Orafajokull, on the S.E. Coast 6,409ft. high, Snœfell before mentioned 5,960ft., and Eyjafjulla Jokull 5,570ft. Not only is the structure of these mountains volcanic, but in some the agency is still active.

The general effect of volcanic agency and the geological formations are seen on a magnificent scale on Mount Hecla. Other remarkable specimens of volcanic agency are seen in the Hot Springs or Geysers, which exist in different parts of the island. One in particular is

situated about 1½ miles from Reykjavik, and is made much use of for laundry purposes.

For those desiring to make excursions to the Thingvalla (where the ancient parliaments were held) and to the Geysers, application must be made to Gier Zoega, who supplies ponies, pack saddles, tents, boxes, &c. The Geyser is 80 miles from Reykjavik, and Thingvalla 40 miles distant. Roads, in our acceptation of the term, only exist within a mile or two of Reykjavik. Horse tracks have to be traversed, and these in many places would be difficult to follow if it were not for cairns, erected to indicate the direction. Rivers have also to be forded. Our stay was taken advantage of by some of the passengers visiting Thingvalla and one only to the Geysers, which he was enabled to view under favourable circumstances.

On leaving Iceland our intended route was to coast along the Faroe and the Shetland Islands, but it having been represented that this would happen in the night it was agreed that the course of the ship should be directed straight to the Orkneys, where those wishing to land would have an opportunity of seeing the Cathedral of St. Magnus at Kirkwall (dating from 1138), the ruins of the King's Castle, and the Earl's Palace. The alteration was accordingly carried out. The ship then left for Leith, landed passengers, again started and duly arrived at Gravesend on the evening of the 28th July. Some landed, others remained on board until the morning when "farewells" were said, many expressing a wish that they might meet again and have an equally agreeable trip on board the "Ceylon," taking this voyage (thus slightly sketched) or one to any other clime.

Thanks were returned to Mr. Clarke for his interesting account

Excursions.

All the four excursions were successfully carried out and well attended.

Excursion to Glastonbury.—The first excursion of the season took place on Tuesday, 29th of April, when 15 members, with three visitors, met at the Midland Station for Glastonbury. At Maesbury Station, about ten of the party left the train for a four-mile walk to Wells. Though the fine view obtainable generally of the City of Wells and the moor was obscured by the haze, yet

the sight—by those hitherto unacquainted with their beauties—of the Cathedral and the Palace grounds amply compensated for the loss of the former. The rest of the party continued their journey in the train to Glastonbury, and filled up the time before the arrival of the others by a visit to the far-famed Lias quarries of Street, about two miles distant. After passing through the long avenue of well-to-do looking houses—whose inhabitants derive their sustenance and support chiefly from the famous manufactories of the Messrs. Clarke—Kaines quarry (formerly known as Crees) was reached, and the Secretary having told the members that it was from this and the adjoining quarries that the Ichthyosauri, which adorned the walls of the Bath Museum, came originally, a workman was found who pointed out each individual bed, whether of rock or shale, to which some local name was given, corresponding accurately with the description of these same beds by Dr. Wright 24 years ago. Several specimens of the reptilian bones encased in their stony covering, and not yet worked out by the chisel, were shown ; and one of the party having succeeded in obtaining a photograph of the quarry, faces were turned towards Glastonbury. Taking the right hand road opposite Northover, Weary-all hill was ascended from the south, and the supposed site of S. Joseph of Arimathea's halt visited—handed down to posterity by a Lias slab in the turf near the top, with the following inscription cut thereon :—

J. A.,
Anno Domini,
xxxi.

the work probably of some historic wag ! The Secretary having alluded to the legend so familiar to most, a descent was made to the hostelry of the George, where lunch was eaten with despatch, and then the Abbey ruins were visited. It need hardly be written that those who had not previously seen these beautiful ruins were most agreeably surprised, but those to whom they were familiar were grieved to see the steady progress of decay which

was eating away the roof of the crypt beneath Joseph of Arimathea's chapel—a board marked "dangerous" warned visitors that the part of the groining above still remaining was ready to fall at any moment. Is the wealthy proprietor of these romantic ruins aware of this? Passing through the nave and beneath what remains of the graceful chancel arch, the Arthurian legend was discussed, and the site of his unearthing (*temp.* Hen. II.) sought in vain. Then to the south along the site of what was once the Cloisters, the Abbey Kitchen was inspected with more or less admiration, and the members started up the town, *en route* for the Tor, but were unable to get farther than the pretty grounds of Mr. Walter Swayne, whence they were content to enjoy the charming view of tower and hill, having only time sufficient to reach the station, *viâ* the pretty walk through Bushey Combe, for the 3.56 train to Bath. The weather was perfect, being balmy and spring-like, quite a contrast to that experienced hitherto during the month. The day passed not without its swallow being seen, though one maketh not a summer.

Excursion to Avebury.—On Tuesday, May 2nd, the club made the second excursion of the season to Avebury, 16 members and friends starting at 8.51 a.m. for Devizes, whence they drove to the village of Avebury, distant about nine miles, passing the Wansdyke which crosses the old Roman road about three miles from Beckhampton. The village of Avebury is surrounded by the immense vallum or rampart within which is a graff (ditch or moat) enclosing those few of the great stones which remain. Traces can be found of the one great circle said to have been composed of 100 stones and of the two smaller ones, but only 15 stones are now standing and about 20 prostrate. These being unhewn are much older than the fashioned blocks standing at Stonehenge, and are certainly of much older date than the earthworks, neither of which, however, appear to have been described before the year 1648. The Church—dedicated to S. James, and consisting of nave, aisles, chancel, and tower—was inspected by some of the club, the

vicar, the Rev. Bryan King, explaining it. It is a very fine stone Saxon building, but the Norman aisles were added in 1120 to 1150. The frescoes on the walls having been covered up with most substantial mortar for many years were only discovered at the restoration of the church a few years ago. The font is Saxon, with Norman ornament, the bowl being carved with the figure of a bishop, holding a Bible and piercing with his crozier a fallen serpent. The three circular windows in the north aisle are remarkable, and so is the "squint" leading from the chancel to the north aisle. Over the chancel arch is a beautifully preserved painted rood screen, and within the chancel a monumental tablet to John Truslow (1593), whose family owned the manor and whose descendants, now in America, have assisted in the restoration of the church.

After lunch the visitors walked to Silbury hill, distant about a mile, and ascended it. Considerable discussion ensued as to the probability of its having been raised by former inhabitants of the place, but its height (170 feet) and the angle of its formation appear to be not in accordance with this theory, and it was believed by some to have been a natural hill whose height has been increased for some purpose, possibly sepulchral.

On returning to Devizes a short visit was paid to the Museum, and the Church of S. John was shown by the Rev. G. A. Cowan. It is a fine edifice, and as restored and enlarged will hold 1,000 persons. Some decorations, supposed to be Norman, have been removed from the exterior of the north wall to make way for a large transept window, but generally the Church appears to have been well restored.

After viewing other Churches and the monuments in the fine Market place, the party returned to Bath, arriving at 5.25 p.m.

Wardour Castle.—The third excursion of the season was to Wardour Castle, on Tuesday, 24th of June. The G.W.R. authorities having obligingly secured two compartments for the party in the 8.51 a.m. train to Salisbury, some fifteen members

enjoyed a pleasant ride through hay-scented meadows, and were, after a short delay at Salisbury, duly landed at the Tisbury station, on the S.W.R. line, about mid-day. A short walk across the fields conducted them into the park, where the shade of the fine oaks and silver firs was most grateful. A grove of rhododendrons in full flower caused a short halt to admire their wild luxuriance, and to allow the stragglers to close up. Leaving the wood and entering the park proper they followed a track beneath the splendid straight-bolled oaks to a very modern-looking doorway. Passing through this they were hardly prepared for the romantic scene which burst upon them, the dense foliage had hidden the ruins from their view entirely, but suddenly as they mounted the steps on to the outer precincts of the Castle, there the old walls stood up, framed amidst veritable monarchs of the forest. Grand old weather-beaten Cedars of Lebanon seemed to throw their gigantic moss-covered arms around the walls as if jealous of any intrusion from outsiders; and at the south-west corner the "iron-wood tree," an American introduction, sent up its smooth stems in large clusters from the ground—a remarkable object! Entering the six-sided court forming the centre of the Castle, with its now disused well (a relic of the tenure of the Castle by the so-called rebels in the period of the civil war), the various portions of the interior were pointed out—the kitchen with its huge open chimney, the hall and vaulted chambers beneath, the Portcullis groove and other indications of its former military purpose. An exit was made through the north-east doorway—a Jacobean structure, bearing marks on the outside of the siege it had undergone in troublous times. As one stood on the outside the history of the siege was recalled; how the force of Sir Edward Hungerford, in 1643, with 1,300 soldiers "or thereabouts," was strenuously withstood by Lady Blanche's handful of brave warriors, her husband, Sir Thomas Arundel second baron, being absent at Oxford in attendance upon his king; and how after a courageous defence of five days an honourable surrender was ungallantly

violated by the victors; and how Sir Thomas soon returned and compelled Edmund Ludlow, left in command, to yield up his prize after a gallant resistance, and as it is said, sprung a mine under his own castle, and thus caused these picturesque ruins, the present home of the owl and the bat—all these events the dent of the cannon balls in the outer wall conjured up. A story writ in Latin over the doorway runs thus :—

Gentis Arundeliæ Thomas Lanhernia proles
Junior, hic meruit primo sedere loco ;
Ut sedit cecidit sine crimine plectitur ille
Insons, insontem fata secunda probant ;
Nam quæ patris erant Mattheus filius emit,
Empta auxit studio principis, aucta manent ;
Comprecor aucta diu maneant augenda per œvum !
Hœc dedit eripuit restituitque Deus.

This same Sir Thomas died of wounds received at the battle of Lansdown, 1648.

The Secretary is indebted to Henry Ford, the intelligent caretaker of the ruins, for a copy of this inscription. Leaving this now peaceful spot with some regret, the members passed through the park, visiting a fine ancient and historical oak tree on the way, and entered the chapel of the modern house, the present proprietor, Lord Arundell of Wardour, having giving them permission to see it, the pictures being unfortunately closed to them, owing to domestic reasons, for the day. As the elderly domestic who admitted them was unable or unwilling to give any account of the pictures therein, a very short stay was made, and the party returned to Tisbury and saw the Church, a fine cruciform structure, with old wooden roofs and good brasses inside. On the chancel wall was hung up a helmet, trophy of one of the earlier barons, a brave and successful soldier, who warred against the Turks, and was for this created Count of the Sacred Roman Empire, 1595. A black marble slab in the chancel records this. Round the edge runs the following :—

Thomœ Arundeliœ primi Baronis de Warder et Sac : Rom : Imp :

Comitis Anna Arundelia pulcherima et optima Conjux Cœcilii Calverti Baronis de Baltimore et absolu : Domi : Festœ Mariœ et Avaloniœ filiaque charissima.

On the face of the slab the following :—

In
floribus, gemmis, gratiis,
(Ipsa in cœlio quanta)
Hic jacet
Anna Arundelia Domina Baltimore.

Anagram :
Non Alia in orbe tam Redamanda, vale,
Amoris ergo conjux P.
Cessit humanis x Kalendis
sextileis
Anno ætat xxxiii. Ab Infante
Deo
CIↃLↃCXLIX.

A fine 16th century brass on the north side of the above, records the resting place of Lawrence Hyde, grandfather of the Chancellor, Edward Earl of Clarendon.

After lunch, time did not admit of an examination of the Portland beds in the Tisbury section, but the train was taken at 3.26 for Wilton. Here the members left the S.W.R., walked to Wilton church, wondered at its art treasures, and caught the 4.43 for Bath, which they reached about 6.30 after a pleasant day.

Cirencester and Fairford.—The Club in their fourth and last excursion, on the 23rd September, visited the interesting Church of Fairford, with its beautiful painted windows. The party left Bath at 9.52 a.m., and went by train to Cirencester, where a break was in readiness to convey them to Fairford. The exterior of the Church was first inspected under the guidance of the Vice-president, the Rev. Prebendary Scarth, who read a paper upon the Church and monuments, treating also of the descent of the manor and the history of the Tame family whose monuments are preserved in the Church, giving a brief history of the windows and stating also what could be ascertained respecting their

date and origin. The party then entered the Church, and after examining the architectural features had the windows fully explained to them by the Sexton, or Curator of the Church. These windows can now be studied at home by the excellent drawings published by the Arundel Society, with careful descriptions of them by the late Rev. G. G. Joyce, formerly vicar of Stratbfield-Saye. On leaving the Church the party partook of a good luncheon provided at the principal inn, and after looking through the cheerful and neat little town of Fairford—interesting not only for its Church and past history, but as the birth-place also of the poet and divine, John Keble—they rejoined their break and returned to Cirencester, where some time was spent in the examination of the noble Church, with its side chapels and extensive porch or parvise. The party then visited the Museum of Roman Antiquities, which contains the fine pavements found on the site of the ancient Roman Corinium. These are well depicted and described in the "Illustrations of Roman Art," by Professor Buckman and C. H. Newmarsh, Esq., 1850. They were unfortunately prevented seeing the ancient Roman amphitheatre, commonly called the "Bull Ring," owing to the gate being locked, and the key not to be found before the evening closed in upon them. The party returned to Bath by an evening train, having spent a very interesting day, and examined one of the best preserved monuments of mediæval art in Britain. The following is Mr. Scarth's paper :—

FAIRFORD AND ITS CHURCH, WITH SOME ACCOUNT OF THE FAMILY OF TAME.

Fairford has been well chosen as a spot to be visited by the Bath Field Club. It possesses objects of especial interest, and has of late years attracted the attention which it deserves.

At Fairford has been found the ancient Saxon Cemetery, described by Mr. Wylie in his book on the "Fairford Graves."* Here has been

* A record of researches in an Anglo Saxon burial-place in Gloucestershire by William Michael Wylie. (Oxford : J. H. Parker. 4to. 13 Lithographic plates.)

found the old Saxon "Situla" or Bucket engraved in the Journal of the Archæological Institute (vol. xxv. p. 137), and here also have been found remains of even an earlier date.

In recent times much has been said and written on Fairford, and a controversy has arisen respecting the beautiful stained windows in the Church, which have been claimed as the work of Albert Durer.

Before touching upon these, something ought to be said respecting the Church which contains them, also regarding the Manor and its descent, something also concerning the monuments which remain in the Church, and the family which they record.

Happily on these subjects we have no lack of information, as recent investigation has brought much to light. (See Journal of Arch. Ass., vol. xxvii. and vol. xxv., also Arch. Journal, vols. xiii. 87 and 274, xvii. 333, xviii. 168, xxii. 370, xxv. 119.)

Mr. Holt in his paper on the Tames of Fairford (Journal of Arch. Ass., vol. xxvii. p. 115, 1871) observes—"Few titles to landed property in this country are invested with a greater degree of romance than that of the manor of Fairford." In A.D. 1461, or about that date, the Manor belonged to the Lady Anne Beauchamp, daughter of Richard, 5th Earl of Warwick, and heiress of the Beauchamps. This lady in 1448 became the wife of the celebrated King Maker, Richard Nevill, Earl of Warwick, and when at Fairford they inhabited a mansion known as Beauchamp and Warwick Court.

The family of Tame settled in Fairford about 1480 (20, Edward IV.) It was then without trade, and agriculture was neglected. John Tame was a cloth manufacturer at Cirencester, and largely interested, therefore, in the breeding of sheep. Fairford became his head-quarters, and he rented large tracts of land in the neighbourhood.

We learn from Leland that "Fairford never flourished before the coming of the Tames into it," but John Tame did not then reside at Fairford, but retained his house at Cirencester, situated near the Church, and occupied by the family as late as A.D. 1521. Antony à Wood, who saw it about 1678, describes it as "an old house built with a great deal of timber, known now by the name of the Swan."

In the time of John Tame, the Lady Anne Beauchamp had become the wife of the celebrated Earl of Warwick, who had usurped the Throne and reigned as Richard III., and his son was created Prince of Wales, 1483. He, however, died at Middleham the year following, and

she became broken-hearted and died the year following, while Richard, her husband, was killed at Bosworth Field. The Manor of Fairford eventually became vested in Henry VII., who appointed Sir Roger Torott as his Steward of the Manor.

The wool trade under the management of Tame seems to have flourished, and he at length, on retiring from active work, took up his residence in the Old Manor House at Fairford by an arrangement with Sir Roger, about the year 1491, and he seems to have lived there in 1495.

The founding of the Church at Fairford has been ascribed to this John Tame, at least if we may credit a statement in Hearne's version of Leland. There seems however some doubts if this statement is correct, and the probability is rather that he *embellished it.* (See Mr. Holt's paper on the Tames of Fairford, Journal of Arch. Ass., vol. xxvii. p. 123, 1871.) It is asserted in Sir Robert Atkins' Gloucestershire, that John Tame, in 1492, took as a prize a ship bound for Rome, in which was certain painted glass; that he brought the glass and workmen into England, and founded Fairford Church for the sake of the glass, and dedicated it to the Virgin Mary in 1493. That a Church existed at Fairford long before this date there can be no doubt, and that it was dedicated to the Blessed Virgin Mary. There exists a record that the Advowson of Fairford Church was granted to Matthew de Winter, born in A.D. 1218, and it is known to have been under the Mother Church of Worcester, in which diocese the county of Gloucester was included, prior to the Reformation. Under the authority of Mother Church a peculiar right was conferred upon the Abbots of Tewkesbury as Visitors of Fairford Church, which is known from the registry at Worcester. The Church was, therefore, built and consecrated long before the time of John Tame. It appears, however, to have been rebuilt some time between A.D. 1490 and A.D. 1495, not by John Tame but by the wealthy ecclesiastical communities of the Cathedral Church at Worcester, and the Abbey of Tewkesbury, with which it was connected.

This subject has been well sifted by Mr. Holt in his papers on the Tames of Fairford, and he gives his reasons why John Tame was not at all a likely person to have built or endowed a Church at Fairford; but that he founded and endowed a chantry in the north chapel of

the Church, known as the chapel of the Virgin Mary, and fitted it up with every requisite for Divine service, as he purposed securing it for his last resting-place.

John Tame possessed no property of his own at Fairford as late as January, 1496, but was only a tenant of a portion of the Royal manor. This is known from his last Will and Testament, in which he bequeaths the sum of £240 for *founding a chantry* in the Church of Fairford. and so obtained the right of interment for himself. He also provides for the expenses of his burial and for the monument which is placed over his remains. For this he allows the sum of £140. The tomb, which is an "Altar Tomb," has upon it the brasses of John Tame and his wife.

In 1498 a cession of part of the manor of Fairford was made to John Tame, but not the lordship, and he then pulled down the old house, called Beauchamp and Warwick Court, and erected a mansion more suitable to his taste. This house is mentioned by Leland, 1545—"There is a fair mansion place of the Tames, hard by the Churchyard, builded thoroughly by John Tame and Edmund Tame, the backside whereof goeth to the very bridge of Fairford" (Itin. vol. ii. p. 21). He died 8th May, 1500. His Will was executed in 1496, but in it he makes no mention of either the Church or the windows, but only provides for *a chantry in the Church*, and for its fittings, together with the tomb to the memory of himself and his wife. The provisions of his Will appear to have been carried out by his son Edmund. The tomb, as we now see it, appears to have been erected about 1520.

It is not improbable that the windows which now adorn the Church were placed there about A.D. 1505-6 by Edmund Tame, as Leland says that "John Tame founded the chantry in the new fair Church of Fairford, dedicated to the Virgin Mary, and that Edmund Tame finished the embellishment of the Church." This is further confirmed by a statement of Antony à Wood.

The Church of Fairford consists of a nave with aisles, and a chancel also with aisles. The whole is a structure of late date. Most of the Church has been restored at a late period, probably about 1488 or 1489; the whole may have been completed about 1500. There are some old wall-paintings in the upper part of the nave, which are said to be similar in character to those in the Chapter-House at West-

minster Abbey. The great feature, however, of Fairford Church is the beautiful series of stained windows, which have excited so much attention in recent times. On the occasion of the visit of the Archæological Association to Fairford in 1868, a very elaborate paper was read by H. F. Holt, Esq., on the "Painted Windows of the Church," in which he sought to prove them to be the work of Albert Durer. (See Journal of Brit. Arch. Ass. (1869) vol. xxv.) This paper led to some controversy, not only on the spot, but was the cause of another paper on the same subject published in the Arch. Journal (vol. xxv. p. 119) by the Rev. J. Fuller Russell.

It is not needful to go further into the subject of this controversy, than to say that able and lucid as Mr. Holt's arguments are, they have failed to convince the most thoughtful artists of their soundness. We will, therefore, briefly consider the subject of these interesting windows. These are 28 in number, and most are divided into several compartments. The subjects are from the Old and New Testaments, and the Apocryphal Gospels, and are to be found in the "Biblica Pauperum," and in the "Speculum Humanæ Salvationis." (See Mr. Holt's description.)

There are four subjects from the Old Testament, "The Temptation of Eve," "The Lord appearing to Moses in the burning bush," "The Double Sign of Gideon's Fleece," and "The Queen of Sheba's visit to Solomon."

The subjects from the New Testament and from the Apocryphal Gospels are "The meeting of Joachim and Anne at the Golden Gate," "The Birth of the Virgin," "The Presentation of the Virgin," "The Marriage," "The Annunciation," "The Nativity of our Lord Jesus Christ," "The Adoration of the Magi," "The Purification of the Blessed Virgin Mary and the Presentation of the Infant Saviour in the Temple," "The Flight into Egypt and the Massacre of the Innocents," "Our Lord with the Doctors in the Temple," "The Assumption of the Virgin," "Christ's entry into Jerusalem," "Christ in the Garden of Olives," "Pilate washing his hands," "The Scourging of Christ," "Christ bearing his Cross," "The Crucifixion," "The descent from the Cross," "The Entombment," "The Heavenly Host vanquishing the Evil Spirits," "The Descent into Hades," "Christ appearing to the Virgin after his Resurrection," "The Transfiguration," "Christ appearing to Mary Magdalene, &c.," "Christ

and his disciples at Emmaus," "Christ appearing to his disciples," "The incredulity of St. Thomas," "The Miraculous Draught of Fishes," "The Ascension," "The Descent of the Holy Ghost," "The Twelve Apostles," and "The Four Primitive Fathers of the Church." Above are "The Twelve Protectors of the Church," surmounted by angels. Opposite are "The Four Evangelists," and "The Twelve Prophets." Above these are "The Twelve Persecutors of the Church," surmounted by Devils. The large west window represents "The General Judgment," and on either side of this a window containing "David sitting in Judgment on the Amalakite," "Two figures of old men," "Samson slaying the Lion," "The judgment of Solomon," and "Sampson slaying the Philistines."

There are 42 subjects in all. We have therefore the full range of Christian teaching displayed in these windows, as well as certain Apocryphal subjects. That these windows had attracted attention, and were early regarded as works of art, appears from an old M.S. edited by Hearne, the Antiquary, in 1716, who asserts that Sir Anthony Vandyke declared to King Charles I. that many of the figures were exquisitely well done, that they could not be exceeded by the best pencil. (See Arch. Journal, vol. xxv. p. 120.) They were even made the subject of a poem by Richard Corbet, Bishop of Norwich (1632—1635.)

The glass was also treated of in a history of Fairford Church, published at Cirencester in 1763, and in an account of the parish of Fairford, which appeared in 1791, a slight sketch of the great west window is given in the Archæologia, vol. xxxvi. plate 31, p. 386.

The Church was visited in 1860 by a party of members of the Archæological Institute, under the guidance of the late Mr. J. H. Parker and the late Mr. Niblett, and the party recorded their opinion that the "glass appeared to be English, and made for the windows in which it is placed."

I must conclude this notice by remarking that the late Mr. Planché, *Somerset Herald*, has treated of these windows in a paper read by him to the Archæological (Association vol. xxvii. p. 100), in which he considers them in relation to early wood-engraving. In this he observes that "no one will dispute that, whoever may have been the designer, the costume, civil and military, is of the time of Albert Durer."

These beautiful windows have been drawn and published by the

Arundel Society, with a description by my late lamented friend, the Rev. J. G. Joyce, late vicar of Strathfieldsaye, who will be remembered by some of the members of our Club, as having some years since guided us over the interesting excavations made by the late Duke of Wellington at Silchester, under his supervision and direction.

I have stated that the windows were probably placed in the Church by Edmund Tame, the son of John. He received the honour of knighthood from Henry VIII, and died in 1534. In his last Will he directs his body to be buried in "our Lady Chapel of the Church of Fairford," and bequeaths to the Vicar the sum of £3 6s. 8d. "Also I Will that my Feoffees of my lands in Castleton to stand and be leased to this only use, i.e. to find a priest for ever to sing for the souls of my father and mother, and for the souls of me and my wife and other my friends, according to the Feoffeement thereof made."

Sir Edmund filled the office of High Sheriff of Gloucestershire. His first wife was a daughter of Sir Edward Greville, and his second a lady named Elizabeth Tyringham. He was confirmed in the Commission of the Peace for Gloucestershire by Henry VIII., 1510, and was returned a second time on the Sheriff's Roll of his native county in 1513. He seems to have withdrawn from business, and to have become attached to the household of Henry VIII., as his name appears on the list of the King's officers as "Knight," and that of his son as an "Esquire." In 1520 the king paid a visit to Fairford and became the guest of Sir Edmund for a week. Upon this occasion he received a grant of the coat of arms, which appear upon the tomb of his father. The king seems to have been so well pleased with his entertainment by Sir Edmund, at Fairford, that he created his son Edmund also a knight, and so testified his Royal approval; and it is supposed that Sir Edmund Tame acquired the Lordship of the Manor of Fairford either by Royal grant or purchase about 1523.

The last years of the life of the elder Sir Edmund appear to have been spent at Fairford, where he died 1st October, 1534, and was buried in the Lady chapel beside Agnes, his first wife. A blue marble slab in the floor of the chantry, founded by his father, marks his resting-place, with an inscription to their memory.

I have touched upon the family history only in reference to the Church and windows; those that would go more fully into it will find

ample materials in the publication of the Arundel Society, and in the paper of Mr. Holt, from which I have drawn much of their personal history. It is a history which shows the rise of many English families, and how industry and energy have raised men of humble origin to wealth and dignity. It is probable that during the great Rebellion, when the Parliamentarian forces were at Cirencester, that the windows of Fairford Church were taken out for the sake of their preservation, but soon afterwards replaced. This has been the cause of some damage, and the glass as well as the fittings have received injury. Portions have been replaced with more recent glass, and parts of figures filled in with common glass.

The elegance and taste of the original can be studied well from the beautiful plates engraved in the Arundel Society's volume (published 1872), where full information is also given respecting the subjects and their treatment.

Fairford is also interesting as being the birth place of the poet and divine, the Rev. John Keble, whose family resided there, and who has left behind him a lasting memorial as the author of the "Christian Year."

BYE EXCURSION.

Lacock Abbey.—On Tuesday, May 6th, twelve members met at the G.W.R. station for the 10.18 train to Corsham, *en route* for Lacock Abbey. The weather was everything that could be desired, the rain of the previous evening having laid the dust, and the three miles' walk was a most pleasant one. Lacock Abbey, which is an extremely picturesque building seems to have been founded by Ela, Countess of Salisbury, in 1229, in memory of her husband, an illegitimate son of Henry II., and was for Nuns of the Order of S. Augustine, and dedicated to the "V.M." of S. Bernard. At the Dissolution it fell to Sir W. Sherrington, and the following romantic tale is told how the Talbots became possessed of it. Sir W. Sherrington's only daughter fell in love with a Talbot. This was against her father's wish, and on one occasion the lady being on the top of the tower saw her lover below and determined at all risks to jump down; this she did, and escaped unhurt.

After her devotion her father consented, and at his death in 1572 the property fell into the hands of the Talbots. The Charter granting the Shrievalty of the county during her widowhood to Countess Ela by Henry III. is extant. The cloisters were first inspected; these are partly 13th and partly 14th century work, with groined roof and coloured bosses, representing animals and grotesque figure heads. There are three gravestones here, one of the Countess of Salisbury. The Nuns' dormitories, with their closely-latticed windows looking into the courtyard, are very picturesque. In front of the house traces of the arches may be seen which originally led to the Church, which appears to have stood where the existing gravel walk now is, in front of the house. The crypt is in good order, but was used by Sir W. Sherrington as a kitchen. In the flooring the monogram "W. G." (Grace, his wife) appears on some of the tiles. The Chapter-house contains two stone coffins, which were found about sixty years ago near the position of the original Church and a tomb inscribed "Ilbert Dechat." The Nuns' kitchen contains a trough cut from a solid block of stone, roughly measured as 10ft. by 4ft. and 2ft. deep, supposed to have been used for the storage of live fish. The remnants of the fireplace still remain; the flue has been built up. The groined roofs of all these buildings are wonderfully perfect. Only one fish-pond now remains in the garden, the others having been filled up. At one end of the pond is a large bronze vessel, on a pedestal, called the Nuns' cauldron, with the inscription: "Anno Domini millesimo quingentessimo Deo laus et gloria Christo a Petro Waghnens in Mechlinia effusus factus fueram," and at the other side a rare species of cypress of considerable size. A good deal of the house and stables is 15 century work. Interior —The entrance hall has a domed plastered ceiling with coloured shields, and is later than the house; here and there are placed figures in terra-cotta, and there are remnants of a suit of armour with the Talbot crest, and a similar helmet was noticed in the Nuns' dormitory. The stone gallery contains portraits of the Talbot

family, some of which bear traces of having been cut from their frames, doubtless in troublous times, and replaced when the surroundings were more tranquil. In one of the bedrooms was some fine tapestry work, said to have been executed by the nuns. The Club, having finished their investigations, adjourned to the Carpenter's Arms, where lunch was anxiously called for, the party returning to Bath by the afternoon train. The village of Lacock contains many pretty bits for the artist, some of the houses are half-timbered work, and very picturesque.

WALKS.

The Walks, due notice of which was posted up at the Institution, have been but poorly attended. The following may be recorded.

July 8th, train to Westbury, thence on foot to White Horse, Bratton Camp, and Edington. Four members only and two visitors were present, the Rev. Cave-Browne-Cave pointed out the beauties of the fine old Priory Church still remaining in its unrestored state, and sent the members back through the lanes to Westbury—a five mile walk to be done in 65 minutes! one not easily forgotten by those who accomplished it. The chief incidents to be remembered in the day were the perfectly successful efforts of a partridge to assume the *rôle* of a wounded bird for the purposes of parental protection to its young, and the glaring heat of the sun even on the top of the Downs.

October 21st, walk over Charmey Down to see the Monkswood Waterworks. Mr. Alfred Mitchell, the City Engineer, kindly met the members at Monkswood and explained to them the series of elaborate works, pipes, catchment troughs, and reservoirs connected with the city water supply. Owing to the deficient* rainfall of the year the reservoir was empty, and the fine deep-seated springs reduced to half their usual volume were conducted directly into the main,

* 4·231 below the average for the last 24 years.

affording but a scanty supply to the inhabitants. It had been calculated that there was sufficient water to give 25 gallons per head per diem. The members returned to Bath by St. Catherine's valley, and remarked that all the upper series of springs were almost, if not quite, dry.

November 11th, train to Frome, thence walked through Orchardleigh Park to the Cromlech. Two stones alone are now standing, one only being upright, the other leaning against it. Both of these are composed of Oolite, another stone lying at a little distance from these, and probably once connected with them, is of Millstone grit. A very good photograph was taken of them by one of the members, and a suggestion made that a trench cut through the bank, which assumed somewhat of a circular form, might reveal the object for which these stones were placed. Orchardleigh Church was next visited, and the Rector, the Rev. J. B. Medley, pointed out the various details of the structure, having been present when the restorations took place under the late Sir Gilbert Scott. The corbels—one on each wall of the chancel with the ring to which the Lenten veil was attached, and the old chalice found during the repairs—were the most remarkable features in this interesting 13th century Church. A pleasant walk across the Park and through the pinery and gardens of the house, kindly permitted by Mr. Duckworth, brought the members to the pretty village and Church of Lullington. A visit to the Church, with its fine north porch, Norman doorway, Norman font with puzzling inscription round the rim, and curious Runic-looking sculptured slab on the boundary wall outside, was made before the members sat down to a lunch hospitably provided at the Vicarage. After lunch the walk was resumed through Wolverton and Norton St. Philip to Wellow, whence train was taken to Bath.

November 18th.—The water supply question being one of the topics greatly interesting the citizens at this time, that portion of the Water-works unseen during the last walk was visited on this

occasion. Leaving the road at Swanswick the members crossed the fields to the reservoirs under Solsbury Hill. The largest was quite empty, the second one had a few feet only of water in it, and the lowest was about half full. Thence they crossed the main valley to St. Catherine's Mill, where a temporary engine was in process of erection to pump the water from the mill-head into the main, seemingly a very doubtful if not hazardous expedient; thence up the valley to the Oakford Springs, where covered tanks had been recently erected to catch the water for storage directly at its source, instead of allowing it to be exposed as heretofore to contamination in a muddy and sedgy bottom. The rams which supply Rock House on the heights above from the surplus water only, worked intermittently owing to the reduced supply. A stiff walk up the sides of the valley brought the party on to the Fosse road, which was followed by Bannerdown to Bath.

January 13th, 1885.—The only other walk worthy of record was that to Murhill Quarry. Train was taken to Limpley Stoke, and before leaving the station the site of the recent bank-slip, carrying away a shed and killing six horses and two men sleeping in the loft, was visited; four of the horses were still lying covered with the *débris* of the fallen shed, on the spot where death seems to have overtaken them instantaneously. Mr. Wickes, of Freshford, met the members and took them over the bridge and across the fields on the right to the quarry on the top of the hill—a fine exposure of Great Oolite now unworked. The various beds from the "roof" upwards were pointed out, especially the peculiar-rotten marly bed immediately above the "roof" containing abundance of *ostrea*, and the coral bed under the *humus*—a bed which Mr. Wickes had lately been working and from which he had obtained many corals; a corresponding bed bored by *lithodomi* exists on the opposite side of the valley, considered by the late Charles Moore to be a coral reef and a thin representative of the Forest Marble. A ruined cairn close at hand was mounted for the view, and the members returned along the edge of the escarpment,

passing by Conkwell and through Mr. Skrine's wood and Inwood's gate on to the common and so to the main road by the dry arch. The day was fine and cold.

The finances of the Club are in a satisfactory state, owing to the careful attention of the Treasurer, whose labours would be considerably lightened if members would give him less trouble by paying up their annual subscriptions more regularly. The balance this year is £25 7s. 10d., after an expenditure of £41 4s. 9d. ; and the number of members continues at its normal standard. It now only remains to add that the Club was formally represented by its Secretary at the Conference of Delegates from Scientific Societies, at the meeting of the British Association in Montreal, when the subject of the Confederation of Local Societies was fully discussed, without arriving at any definite conclusion. Our Club has, however, been placed on the list of Corresponding Societies in connection with the British Association, and it may be well to remind the members that they are expected to forward as much as possible the chief objects, for which such societies have been formed, *e. g.*, investigations of the Geology, Natural History, and Antiquities of the neighbourhood. ; records of new sections opened ; record of the height and variations in level of water in wells, and other facts connected with underground waters and underground temperature ; record of erratic blocks in the locality ; measurement of rainfall, time of flowering of certain plants, the arrival of the migratory birds, the appearance and injuries of insects, &c. ; and the present condition and future preservation of objects of Antiquity in the locality. Our neighbourhood is well adapted for affording observations on such topics, and the members are urged to take advantage of the opportunities afforded by the weekly Walks and other Excursions, and energetically contribute to the advance of such systematic local investigation.

H. H. WINWOOD,
Hon. Sec.

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